




3 1761 11766694 1









Digitized by the Internet Archive  
in 2023 with funding from  
University of Toronto

<https://archive.org/details/31761117666941>







86

CURRENT

A1  
H  
57  
HOUSING RESEARCH

VOLUME 8, NO.1

SUMMER 2001

**SOCIAL,  
ECONOMIC AND  
TECHNICAL  
RESEARCH**



HOME TO CANADIANS  
Canada



Issued also in French under the title: ***Recherches courantes sur l'habitation***

Publié aussi en français sous le titre: ***Recherches courantes sur l'habitation***



## CURRENT HOUSING RESEARCH ORDER FORM

If you wish to receive any of the completed reports or bibliographies listed, or if you would like to be on the mailing list to receive *Current Housing Research*, please fill out this form and send it to:

Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa ON K1A 0P7  
Fax (613) 748-4069  
Telephone 1-800-668-2642 or outside Canada, phone (613) 748-2003  
Email: [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)

### COMPLETED REPORTS REQUESTED


### BIBLIOGRAPHIES REQUESTED


☐ Send copies of above reports/bibliographies

☐ Add my name to your mailing list to receive *Current Housing Research*

Name		
Mailing Address		
City	Province	Postal Code





## INTRODUCTION

Welcome to "*Current Housing Research*". This publication merges "*Housing Research Quarterly*" and "*Current Housing Technology Initiatives*" and continues the numbering of the "*Housing Research Quarterly*".

Under Part IX of the National Housing Act the Government of Canada provides funds to Canada Mortgage and Housing Corporation to conduct research into the social, economic and technical aspects of housing and related fields.

*Current Housing Research* is compiled and produced three times a year by the Canadian Housing Information Centre. This publication provides information and access to research which is undertaken and sponsored by the Corporation. It is also available on CMHC's Website at [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)

The publication contains information on completed research reports, new publications, videos and bibliographies, as well as planned and ongoing research projects. An alphabetical title index of items listed is included at the end for quick reference.

The overall arrangement of "*Current Housing Research*" is by broad subject category. Within each subject category, lists of planned and ongoing projects and completed research reports are described.

Each entry can contain the following elements:

- The project or report title;
- A description of the project or report results;
- The CMHC Project Officer who is managing the project;
- The Division within CMHC which is responsible for the project;
- For External Research Projects, the grant recipient undertaking the research;
- A Contract Identification Number (CIDN);
  
- The Status of the project: whether the project is in a planned, ongoing or completed phase. "Planned Projects" are those that are not yet underway, but are likely to be initiated in the current year. "Ongoing Projects" refer to research projects which are currently underway. No reports are yet available. Once the project is completed, and a report is available for distribution, it will be listed as a "completed report."
  
- Whether the report resulting from the research project is available and the address where the completed report can be obtained.

To discuss research projects that are recent or ongoing, please call CMHC General Inquiries at (613) 748-2000 and ask for the CMHC Project Officer identified under each project description.

It is a very interesting question, the answer to which is not yet known. The question is: "What is the meaning of the word 'the'?"

The answer is: "The" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.

The word "the" is a word which is used to refer to a specific person or thing. It is a word which is used to refer to a specific person or thing.



## CMHC'S EXTERNAL RESEARCH PROGRAM

The objective of the CMHC External Research Program (ERP) is to encourage and enable researchers in the private and not-for-profit sectors to put forward and carry out relevant, innovative, and high quality housing research projects. Under the Program, financial contributions are made to support research investigations into important questions, problems, and issues affecting Canadian housing. Housing research priority areas are identified in the "External Research Program Grants for Housing Research Guidelines and Application Form".

Applicants to the External Research Program must be Canadian citizens or have permanent resident status in Canada.

Independent researchers as well as those employed in Canadian universities, institutions, private consulting firms, the professions and the housing industry may apply for these grants.

Full-time students at the graduate or undergraduate level are not eligible to apply. Students may be hired to assist in the conduct of the research, but under no circumstances may they take over responsibility for the direction of the work or the quality of the final report.

Individuals who are full-time federal, provincial or municipal government employees may apply. However, to be eligible, an applicant must provide a letter of support from her/his employer which shows that the proposed research is not part of, and will not interfere with, her/his regular work. CMHC employees are not eligible to receive grants under this Program.

CMHC is interested in receiving applications on topics related to its housing research priority areas. New ideas and innovative approaches in these areas are welcome.

To obtain the booklet outlining the priority research areas, the guidelines and application form for the External Research Program you may contact:

The Administrator  
CMHC External Research Program  
Research Division  
Canada Mortgage and Housing Corporation  
700 Montreal Road, Room C7-307  
Ottawa, Ontario  
K1A 0P7  
Telephone: 613-748-2249  
Fax: 613-748-2402  
E-mail: [erp@cmhc-schl.gc.ca](mailto:erp@cmhc-schl.gc.ca)





## TABLE OF CONTENTS

	PAGE
Order Form	3
Introduction	5
CMHC' s External Research Program	7
Subject Index	11
Technical research	13 - 67
Social and Economic Research	69 - 111
Bibliographies	113 - 117
Title Index	119 - 128





## SUBJECT INDEX

Aboriginal Housing .....	15, 70
Acoustics .....	16
Basements, Foundations & Crawlspace .....	16
Building Codes .....	18
Building Materials .....	19
Children's Environments .....	72
City Planning and Human Settlements .....	72
Concrete .....	21
Consumer Protection .....	22, 74
Contaminated Lands .....	22
Cooperative and Non-profit Housing .....	74
Energy Conservation .....	23
Fires & Fire Prevention .....	27
Heating and Ventilation .....	28
High-Rise and Multiple Unit Construction .....	31
Home Ownership .....	45, 75
Homelessness .....	76
House Construction .....	45
House Construction Industry .....	48, 79
Housing .....	49, 80
Housing Affordability .....	82
Housing and Immigration .....	84
Housing Design .....	49
Housing Export Opportunities .....	85
Housing Forecasting and Demand .....	90
Housing Market .....	91
Indoor Environment .....	49
Manufactured Housing .....	53
Moisture and Mold .....	54
Mortgages and Housing Finance .....	91
Northern Housing .....	56
Persons with Disabilities .....	92
Property Management .....	58
Regulatory Reform .....	59, 94
Renovation and Inspection .....	59, 99
Rental Housing .....	99
Residential Development .....	102
Seniors .....	104
Social Housing .....	106
Sustainable Development & Healthy Housing .....	62, 107
Urban Transportation .....	109
Water Conservation, Reuse & Management .....	65
Youth and Housing .....	110



## TECHNICAL RESEARCH





## **COST-EFFECTIVE INDOOR AIR QUALITY AND ENERGY EFFICIENCY RECOMMENDATIONS FOR FIRST NATIONS HOUSING**

The purpose of this research project was:

- to prove that less capital investment in First Nations housing but acceptance of higher costs incurred over the life cycle of a house is not cost-effective;
- to demonstrate the potential for cost-effective, improved housing in First Nations communities; and
- to demonstrate the value of investigations according to the CMHC Indoor Air Quality Investigative Protocol and the Energuide for Houses Evaluation Protocol as repeatable, effective renovation planning methods that could be implemented by First Nations technical service providers.

Indoor air quality investigations and house energy efficiency evaluations, according to the recognized protocols noted above, were conducted on five sample houses volunteered by the Washagamis Bay First Nation.

The research found that the sample of First Nations houses that were investigated were built with low capital expenditure which in the long run compromised the indoor air quality and durability of the houses as well as increased the maintenance costs. The study showed that it is cost effective to implement energy saving strategies at the same time as improving the indoor air quality of the homes.

*Prepared by Bill Boles. CMHC Project Officer: Virginia Salares. Ottawa: Canada Mortgage and Housing Corporation, 2001 (External Research Program)*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## **INFORMATION TRANSFER OF HEALTHY HOUSING (HH) TECHNOLOGY IN THE ABORIGINAL CONTEXT**

This project included a Healthy Housing Symposium which took place in June 2000 in the Eagle Lake community (Ontario) and coincided with the grand opening of a Northern Healthy House demonstration unit built by the Eagle Lake community. First Nations interested in Healthy Housing shared construction experiences, appropriateness of the technology and other issues related to Healthy Housing. An Aboriginal consultant is producing a First Nations Healthy Housing best practices booklet to illustrate options, solutions and innovations to address some critical health, safety, durability and affordability concerns of on-reserve First Nations housing. The booklet should be available early summer of 2001.

**CMHC Project Officer :** Alain Croteau

**Division :** Assisted Housing Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2317 020002

**STATUS :** Ongoing Project

**\*\* SEE ALSO:** p. 70-71

## SUMMARY REPORT FOR CONSORTIUM ON FIRE RESISTANCE AND SOUND INSULATION OF FLOORS: SOUND TRANSMISSION CLASS AND IMPACT INSULATION CLASS RESULTS

The IRC Acoustics Laboratory has completed the measurement phase of a study of airborne and impact sound transmission through typical floor constructions used in Canadian housing. As well as the Institute for Research in Construction (IRC) of the National Research Council of Canada, this project was supported by a consortium of some 18 different organizations and government departments, including Canada Mortgage and Housing Corporation and the Canadian Home Builders' Association. This report presents the sound transmission class (STC) and impact insulation class (IIC) ratings for all the floors in the project. Some of the specimens were chosen by IRC for technical reasons, but the majority of the specimens were approved as part of a structured series established collectively by the consortium. The acoustical measurements included impact sound measurements using experimental, non-standard devices. These measurements were made to provide extra information that might be used to improve the existing standardized tapping machine test or to develop new test procedures. A further IRC report will deal with these experimental impact measurements in detail. The combined set of over 190 specimens provides:

- data for systematic evaluation of sound transmission through joist floor systems;
- data for development of prediction methods;
- data for development of improved constructions; and
- a consistent assembly of sound transmission class and impact insulation class data needed by builders and regulators to select constructions suitable for party floors in multi-family dwellings.

*Prepared by A.C.C. Warnock and J.A. Birta, Institute for Research in Construction, National Research Council Canada. Ottawa: Canada Mortgage and Housing Corporation, 2001, c1998. xiv, 121 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## BASEMENTS, FOUNDATIONS & CRAWLSPACES

### ABOUT YOUR HOUSE PUBLICATION ON UNDERSTANDING AND DEALING WITH INTERACTIONS BETWEEN TREES, SENSITIVE CLAY SOILS AND FOUNDATIONS

This About Your House publication will provide background information and advice on understanding and dealing with interactions between trees, sensitive clay soils and foundation problems. It will describes where these soils exist, the impact of soil shrinkage on foundations and the potential role of trees in soil shrinkage. It will provide a summary of some of the important factors related to soil shrinkage and foundation stability, as well as tips for managing a tree's contribution to foundation damage.

**CMHC Project Officer :** Susan Fisher

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2229 0200002

**STATUS :** New Project



## COMPREHENSIVE STUDY ON SLAB-ON-GRADE FOUNDATIONS

The purpose of this project is to investigate and provide answers to technical questions on slab-on-grade insulation, moisture protection, and heating systems appropriate to be used with such a foundation type, and cost effectiveness in various climate regions of Canada. Other aspects to be studied will be: consumer acceptance of this type of "basementless" house; alternate layout designs to accommodate storage; overall pros and cons of the alternative house foundation type.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 2275 0200

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## INSULATED CONCRETE FORMS TRAINING PROGRAM

This is a multi-partnered project with members including: Cement Association of Canada (CAC), Portland Cement Association (PCA), Insulating Concrete Form Association (ICFA), National Energy Conservation Association (NECA), Alliance of Canadian Building Officials Association (ACBOA), Association of Canadian Community Colleges (ACCC), Seneca College, Southern Alberta Institute of Technology (SAIT), Atlantic Home Builders' Training Board (AHBTB), Canadian Carpentry Union, CHBA, NRCan and CMHC. The CAC is currently developing a two day training program consisting of two modules; Introduction to Insulated Concrete Form Construction, and Fundamentals of Concrete Footings and Foundations. The training program will be of interest to home builders, home inspectors, building officials, and the trades involved in the installation of ICFs. The training program will be developed and piloted over the next two years and will then be delivered through various educational institutions across the country by the year 2003.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2411 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## PERFORMANCE GUIDELINE DEVELOPMENT FOR BASEMENT SYSTEMS AND MATERIALS

CMHC is a participant contributing research to this multi-disciplinary, multi-agency study led by the National Research Council identifying knowledge gaps in the performance of basement systems. Guidelines are being developed for design, construction and evaluation of basement materials and systems to ensure their durability and long-term performance. Field work is complete. Guidelines are being drafted. CMHC will look into ways to inform builders and the public about better basement designs.

**CMHC Project Officer :** Don Fugler

**CIDN :** 1421 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

**\*\* SEE ALSO:** *Innovative Foundations, Heating & Ventilation*, p. 56

*Residential Foundation Systems for Permafrost Regions*, p. 57

### **PROJECT TO PROMOTE IMPLEMENTATION OF THE NATIONAL BUILDING CODE AND A STANDARDIZED BUILDING PERMIT IN PRINCE EDWARD ISLAND: THE HOME BUILDERS' ASSOCIATION OF PRINCE EDWARD ISLAND = PROJET VISANT À PROMOUVOIR L'ADOPTION DU CODE NATIONAL DE BÂTIMENT ET D'UNE FORMULE UNIFORMISÉE DE DEMANDE DE PERMIS DE CONSTRUIRE À L'ÎLE-DU-PRINCE-ÉDOUARD : LA HOME BUILDERS' ASSOCIATION OF PRINCE EDWARD ISLAND**

This case study report describes the work in 1998 of the P.E.I. Home Builders' Association to persuade municipal and provincial authorities to adopt the National Building Code and to implement a uniform building and development permit application form. Of the 89 municipalities in Prince Edward Island, only two, Charlottetown and Summerside, apply and enforce the NBC. There is also no building code enforcement in unincorporated areas of the province. The study outlines the arguments in favour of adoption, including consumer protection, safety, financial and industry issues and the impacts on affordability, choice and quality. The standardized permit application form developed by the P.E.I. Home Builders Association is included as an appendix.

Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2000. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 36 pages

Order Number: 62001

Étude de cas rédigée par : Word-Works Communications Services. Préparée pour : la Fédération canadienne des municipalités ; l'Association canadienne des constructeurs d'habitations ; l'Association canadienne d'habitation et de rénovation urbaine ; la Société canadienne d'hypothèques et de logement. Ottawa : FCM ; ACCH ; ACHRU ; SCHL, 2000. (Abordabilité et choix toujours (ACT) projet de réforme de la réglementation ; ACT - étude de cas) 36 pages

**STATUS** : New Completed Report

**AVAILABILITY** : CMHC Information Products

### **RECOGNITION OF SECONDARY SUITES IN THE NATIONAL BUILDING CODE**

Secondary (or accessory) suites represent an affordable housing option that has received growing attention from provinces and municipalities in recent years. The National Building Code (NBC) currently views them as duplexes or semidetached units. Some Canadian provinces have changed their Building Codes to allow more lenient requirements for secondary suites, particularly in older houses. This study examined legislation governing secondary suites in several jurisdictions leading to the preparation of a discussion piece on possible changes to the NBC for the recognition of this housing form in the Code.

**CMHC Project Officer** : Brian Eames

**Division** : Research Division

**AVAILABILITY** : Publication is not available

**CIDN** : 2233 0200001

**STATUS** : Ongoing Project

## BUILDING CODES

### REWRITING TEST STANDARD CAN/CGSB-149.10 - DETERMINATION OF THE AIRTIGHTNESS OF BUILDING ENVELOPES BY THE FAN DEPRESSURIZATION METHOD

The airtightness standard used for testing houses dates back to 1986. The object of this project is to re-write CAN/CGSB-149.10, incorporating some updates and some alternative techniques. There have been no meetings up until now but there has been extensive consultation by e-mail and document review. Progress has been delayed due to the lack of consensus by committee members. The contractor who assembled the new draft of the document is looking into modifications of the text to satisfy some of the objections.

**CMHC Project Officer :** Don Fugler

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1971 0200002

**STATUS :** Ongoing Project

### ROLE OF CONSTRUCTION CODES IN THE CANADIAN BUILDING SYSTEM

The purpose of this joint venture project with NRC and CHBA is to develop two papers which will help in the understanding of the changes to the Model National Codes which are occurring as a result of efforts currently underway to clarify the objectives of these codes and move them to being Objective-Based. The first paper is entitled "Canada's Construction System and the Context for Model Codes". It presents an overview of the system of construction in Canada and the role of Model Codes in that system. The second paper describes the value and benefits of Objective-Based Codes to residential builders and renovators. The papers have been published by NRC.

**STATUS :** New Completed Report

**AVAILABILITY :** On the Internet: <http://www.ccbfc.org/ccbfc/tgs/obc/docs/>

## BUILDING MATERIALS

### PERFORMANCE OF PLASTIC AND COMPOSITE MASONRY TIES

The objective of this project is to investigate the possibility of using alternative materials (plastics or composites) in the fabrication of masonry ties. Detailed research will be undertaken to determine what has been done in the field of masonry ties around the world. The information received will be reviewed with respect to the appropriateness of plastic or composite masonry ties for masonry construction and the opportunities they represent.

**CMHC Project Officer :** Luis de Miguel

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2144 0200020

**STATUS :** Ongoing Project



### SERVICE LIFE OF MULTI-UNIT RESIDENTIAL BUILDING ELEMENTS AND EQUIPMENT

Maintaining Canada's housing stock requires timely investment of funds for replacement of building elements and equipment. CMHC engaged IBI Group to survey experienced building professionals across Canada to obtain real life, non-theoretical estimates of service life for over 230 components in apartment buildings over five storeys high. The information was collected through a three-stage survey and analysis process resulting in an average high-end and low-end estimate of service life for each building item. The resulting range was then divided into approximately equal three sub-ranges: below average, average and above average length of service life. Using a model building, costs were developed based on specific assumptions for length of building life, inflation rate for construction and discount rate. This information produced a range of annual contribution amounts necessary to maintain the reserve fund. This report summarizes the study, lists the results and describes a process to make immediate use of the information.

A generic reserve fund cash flow model has been prepared as part of this project. You may obtain a copy of the Excel spreadsheet from the following URL address:

<ftp://ftp.cmhc-schl.gc.ca/servicelife>

*Prepared by IBI Group. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2000. (Housing Technology Series) 68 pages*

Order Number: 62280

Note : Aussi disponible en français sous le titre : La Durée de vie utile des matériaux et équipements techniques des édifices résidentiels de moyenne et grande hauteur

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

### VIRTUAL SAMPLE ROOM WEB SITE OF GREEN BUILDING MATERIALS - PHASE II

The Virtual Sample Room is a web site that provides information for designers, builders, renovators, and consumers on building materials that are environmentally responsible and/or minimize indoor air pollution. The site was developed and continues to be owned by a consortium of federal government departments and municipalities. The purpose of this Phase II project was to expand the number of product listings from the original 200, and to improve the promotion of the site. The site now includes approximately 750 product listings, covering almost all areas of construction, and is being promoted by the various partners. The site has a new URL and will be "re-launched" later in 2001. The site is now active and can be visited at <http://www.designinggreen.com/>.

**STATUS :** Completed Report

**AVAILABILITY :** On the Internet: <http://www.designinggreen.com/>.

## BEST PRACTICE GUIDE FOR PRE-CAST CONCRETE WALLS

The objective of this project is to develop a practical, advisory document for designers, architects and engineers, and manufacturers, related to precast wall panels in residential applications. Precast is a well developed system in commercial applications but it requires special treatment when used in housing. The project will be conducted in partnership with the Canadian Precast and Prestressed Concrete Institute, installers and their associations. This Guide will be produced as a joint publication through a collaborative project with Public Works Government Services Canada. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to precast walls, construction details in AutoCAD format, outline specifications and additional sources of information and references. The anticipated release date for the product is November 2001.

**CMHC Project Officer :** Luis de Miguel

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2215 020001

**STATUS :** Ongoing Project

## BEST PRACTICE GUIDE FOR THE EVALUATION, REPAIR AND MAINTENANCE OF PARKING GARAGES

The objective of this project, a partnership between CMHC and PWGSC, is to develop an advisory document providing guidance for the appropriate evaluation, repair, protection, maintenance and monitoring of concrete parking structures.

Billions of dollars are spent annually to repair and maintain concrete structures. Parking garages are subjected to demanding service conditions; not only vehicular loading but also thermal and moisture loads. In addition, the growing trend toward the use of de-icing salts on our roads by municipalities will ensure the need for future concrete repairs and replacement despite a variety of protective measures to delay the deterioration process. Frequent and often unexpected repairs to these structures place enormous financial burdens on the building owners and property managers.

The principal output from this project will be the production of a detailed technical document aimed specifically towards engineers and technologists involved in the evaluation, maintenance and repair of parking structures.

**CMHC Project Officer :** Silvio Plescia

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2278 0200

**STATUS :** Ongoing Project

## INVESTIGATION AND REPAIR STRATEGIES FOR CONCRETE CONSTRUCTION AND CATALOGUE OF INNOVATIVE CONCRETE ASSESSMENT AND REPAIR TECHNOLOGIES

The purpose of this project is to create a survey questionnaire on concrete assessment, repair and monitoring strategies and report on existing protocols regarding concrete problems in multi-unit residential buildings.

**CMHC Project Officer :** Silvio Plescia

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1890 020002

**STATUS :** Ongoing Project

### STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS

This project will research current assessment, monitoring and repair strategies for concrete repair. Existing protocols commonly used in the field as well as existing protocol guidelines assembled by various agencies (e.g. CSA) will be catalogued. This research will provide consultants, contractors and building owners with available protocols and concrete repair strategies.

**CMHC Project Officer :** Silvio Plescia

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1890 0200002

**STATUS :** Ongoing Project

## CONSUMER PROTECTION

### OVERVIEW OF CONSUMER PROTECTION FOR HOUSING IN CANADA

For most Canadians buying a house is the largest financial expenditure they are ever likely to make. On an ongoing basis, housing represents a major component of household expenditures whether for mortgage or rent payment, maintenance and repairs or renovations and improvements. This project provides an overview of the context and issues surrounding consumer protection for housing in Canada and collected information on programs, initiatives and activities available to consumers. These include warranty programs, inspection services, consumer information products, training activities, etc. For each, a brief description is provided as well as contact information (website, telephone, address) for the national and/or provincial organizations and associations who offer the programs and can provide more detailed information. The research is complete and a draft report and detailed information about the available programs has been received. The information will be incorporated into a new series of "About Your House" pieces on topics such as "Hiring a Home Inspector", "Hiring a Lawyer or Notary Public", "A Guide to Home Warranties". Some of the topics are already addressed in other recent AYHs such as Hiring a Contractor and the Renovation Series.

**CMHC Project Officer :** Brian Eames

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2135 0200001

**STATUS :** Ongoing Project

## CONTAMINATED LANDS

### DEMONSTRATION OF SAFE HOUSING ON LIGHTLY CONTAMINATED LANDS

CMHC research into contaminated lands shows that some types of soil contaminants could be rendered innocuous through building design and operation. One example is heavy metals deep within the soil. If these pollutants can be avoided through design, the cost of land remediation could be greatly reduced. The project will include contaminant monitoring and the investigation of the predictive capabilities of site specific risk assessments. Two of the three case studies are complete: a potential soil gas movement problem in a Vancouver high-rise and heavy metals moving from fill in the vicinity of Wells, BC. A third potential location has been identified in the Yukon. Testing will have to follow construction of the houses, which may not take place until 2002.



## CONTAMINATED LANDS

**CMHC Project Officer :** Don Fugler

**CIDN :** 1946 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## ENERGY CONSERVATION

### AIR LEAKAGE CHARACTERISTICS, TEST METHODS AND SPECIFICATIONS FOR LARGE BUILDINGS

CMHC recently completed a survey of published air leakage data for multi-unit residential and large commercial buildings. The objective of the study was to compile air leakage data for large buildings, identify air leakage test methods, performance targets and the availability of specifications and quality control procedures to reduce air leakage in large buildings. The results of the review show that virtually all large buildings, both new and old, are quite leaky when compared to recommendations contained within the Appendices of the 1995 National Building Code of Canada. Measured air leakage levels range from 10 to 50 times recommended levels. Despite this, there have been several building projects that have demonstrated that air leakage can be significantly reduced when proper building air barrier details are designed and installed, and where quality assurance measures are in place. The information provided by this project serves to baseline the current performance of air barrier systems in conventional large buildings and also shows what levels of performance are possible with better design, construction, testing and commissioning methods. The project report will serve as an important reference document as efforts move forward to improve the quality of building envelope systems.

*Prepared by Gary Proskiw, Proskiw Engineering Ltd. and Bert Phillips, Unies Ltd. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2001. 85 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### ALTERNATIVE HOME ENERGY SOURCES FOR THE NORTH

This is a partnership project between Alaska Housing Finance Corporation, Arctic Energy Alliance and CMHC. Access to alternate energy in the North was an important issue identified in the 1998 Client Consultation. While much literature exists on alternative home energy sources, most of it is too complex for general comprehension. Further, much of this information has not been verified for applicability to the North including availability and performance of alternative energy products in the North. This project will provide a full summation of options, a cost benefit analysis based upon present individual utility infrastructures and costs as well as regional climatic requirements, reference and contact information. The final report will be available in the Summer of 2001.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2312 0200003

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS

An energy and greenhouse gas emission simulator will be developed to model the impacts of energy efficiency measures on large buildings. The energy simulator will be capable of analyzing the impact of individual, or packages of, energy efficiency measures on the energy consumption and greenhouse gas emissions of large commercial and multi-unit residential buildings. Regional and national energy and greenhouse gas emission reductions will be assessed by using the simulator to evaluate the impact of energy efficiency measures on the buildings in a representative building database. The results of the analysis will then be projected to national levels to determine the extent of retrofit measures that are required within the building stock to meet the reduction targets set by the Kyoto Protocol in December 1997.

**CMHC Project Officer :** Duncan Hill

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2249 0200001

**STATUS :** Ongoing Project

## CASE STUDIES OF MAJOR HOME ENERGY RETROFITS

To meet targets for greenhouse gas production in Canada, the residential sector will have to significantly reduce energy consumption in existing houses. A 1995 CMHC report suggested that houses built prior to 1989 will have to reduce energy consumption on average by about 40%. This is a big reduction, one that is rarely realized in programs funded by government or the utilities. The object of this research is to see whether four or more relatively normal houses can have their total energy usage reduced by 40%. Saskatchewan Research Council has been hired to determine this. The houses have been selected and the retrofits contracted by the owner should be completed by summer 2001 and monitoring for a year will establish whether the 40 % goal can be achieved.

**CMHC Project Officer :** Don Fugler

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2349 0200001

**STATUS :** New Project

## ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is in the process of documenting the application of energy efficiency measures in multi-unit residential buildings to be used as case studies. A trial case study of a housing co-operative in Ottawa is underway, to not only assess the strengths and weaknesses of the energy efficiency measures implemented, but also to identify what information can be disseminated to others in the building industry. Upon completion of this first case study, CMHC will be soliciting the housing industry for additional energy efficiency case studies. A compendium of case studies will be made available from CMHC. The case studies will also support the Energy Efficiency Opportunities Manual for Multi-Unit Residential Buildings that CMHC is in the process of developing. The case studies currently underway include:

1. Conservation Co-op, Ottawa
2. Dual Fuel Heating System, Oshawa
3. Energy Efficiency Retrofit of an Apartment Building, Toronto
4. Case Studies of Interior Insulation Retrofits in Buildings with Solid Masonry Walls (CMHC "A" Building, Ottawa; Lofts Corticelli, Montréal; Karcher Building, Prince Albert)
5. The Complete Rehabilitation of the Broadview Apartment building.

## ENERGY CONSERVATION

**CMHC Project Officer :** Duncan Hill

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1899 0200002-3

**STATUS :** Ongoing Project

### ENERGY EFFICIENCY OPPORTUNITIES MANUAL FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC, in partnership with the Ontario Ministry of Municipal Affairs and Housing (OMMAH), is in the process of developing a manual that details energy and water efficiency measures for existing multi-unit residential buildings. The document will be based on a manual originally developed by the Ontario Ministry of Housing in the early 1980's. The new manual will offer proven, current energy efficiency measures for the building envelope, mechanical, electrical, and domestic hot water heating systems. A web-based version of the manual is being developed that will be installed on the CMHC web-site. Individual energy and water efficiency measures are being placed on the high-rise group website as they are developed. The measures are being publicized as the energy and water efficiency "Tip of the Week" (<http://www.cmhc-schl.gc.ca/rd-dr/en/hr-trs/tipsweekly.htm>). The production of the web-based, and translated, version has also allowed for a simultaneous final editing of the manual in preparation for publication.

**CMHC Project Officer :** Duncan Hill

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1887 0200002

**STATUS :** Ongoing Project

### ENERGY USE PATTERNS OF OFF-GRID HOUSES

In support of housing sector opportunities to reduce greenhouse gas, a contractor surveyed twelve households across Canada which have been 'off the grid' for at least two years, with a focus on renewable energy sources such as solar, wind, and micro/mini-hydro. The contractor documented energy use and lifestyle patterns that accommodated the limits of off-grid electrical production. The objective is to provide examples of approaches relevant to mainstream housing. The field work is complete and the report is in production.

**CMHC Project Officer :** Don Fugler

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2350 0200001

**STATUS :** New Project

### FINANCIAL TOOLS FOR CO<sub>2</sub> REDUCTION

This project responds to Canada's planned Kyoto commitment to take actions that will help reduce CO<sub>2</sub> emissions. It aims to identify financial mechanisms that can encourage and accelerate the adoption of energy efficiency measures for existing and new housing. It will survey financial mechanisms that have been used in Canada and abroad and evaluate their potential for take up and energy use reduction. It will examine in more depth six initiatives and draw from them lessons that would apply to Canada's conditions. It will subsequently examine a number of initiatives for further consideration re: potential adoption and/or adaption in Canada.

**CMHC Project Officer :** Fanis Grammenos

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2281 0200001

**STATUS :** Ongoing Project



### OPTIMIZING HEAT AND AIR DISTRIBUTION SYSTEMS WHEN RETROFITTING HOUSES FOR ENERGY EFFICIENCY

When a house undergoes energy upgrading, either by improving the envelope or the heating system, one factor often overlooked is the heating or ventilating distribution system. With support from the Program for Energy Research and Development (PERD), CMHC will be undertaking research into distribution system upgrades, probably in conjunction with other federal agencies. The first stage of this work is a review of the performance characteristics of current and innovative distribution systems. The project would start by establishing the operating characteristics of HVAC equipment and distribution systems. This would include both old, existing systems; current, off-the-shelf components; and new distribution systems coming on the market. As well, this review would identify problems with the integration of upgraded heating or cooling systems and existing energy distribution systems in houses. The output of this project would help guide the next phases of the work: laboratory studies, field studies, and demonstrations.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2440 0200001

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

### RETROFITTING A CITY - LESSONS FROM TORONTO'S BETTER BUILDINGS PARTNERSHIP PROGRAM

The primary goal of this project is to help municipalities across North America improve energy efficiency in buildings and reduce their greenhouse gas emissions. Based on Toronto's successful Better Buildings Partnership Program the project will produce a useable manual for designing and implementing municipal building retrofit programs to improve water and energy efficiency. Building retrofits can reduce greenhouse gas emissions by lowering energy consumption. Undertaken on a wide scale, retrofitting buildings can enhance the sustainability of urban centres by diminishing air pollution locally and slowing the rate of consumption of natural resources.

**CMHC Project Officer :** Brian Eames

**CIDN :** 2355 0200001

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

### SURVEY OF MULTI-UNIT RESIDENTIAL BUILDING CHARACTERISTICS AND ENERGY USE DATA

This project involves the collection of the physical and operational characteristics of 40 multi-unit residential buildings from all regions in Canada. Energy and water consumption histories for the past 2 to 3 years have also been collected for each building. The survey portion of this work is now complete. CMHC is in the process of developing a database to store the building files and to allow for the comparison of energy and water usage given building age, size, region, fuel type and occupancy. The building files will also be used in combination with an energy simulator-greenhouse gas estimator to estimate the impact of upgrading the stock of multi-unit residential buildings in Canada. It is envisioned that the database will be supplemented with additional buildings that CMHC will access in the course of other research projects.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2249 0200002

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available



## CLEANING UP YOUR HOUSE AFTER A FIRE

After a Fire is a consumer publication being prepared to help homeowners deal with fire damage in their homes. This publication will explain the issues to be considered to restore the home and to ensure a safe, healthy environment for the occupants. It is intended to be a brief publication targeted to the consumer, but it will also be useful to fire departments, restoration contractors, and insurance companies.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 2298 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## FIRE SAFETY FOR INFILL CONSTRUCTION SITES

As a result of a large fire in Ottawa's Glebe community (\$6 million in damage and 40 homeless) which started in infill housing under construction, the City of Ottawa and CMHC undertook a review of possible Building Code or Bylaw changes governing infill projects during construction. The study reviewed the potential fire risks in early phases of construction and the range of measures that could be employed to mitigate these risks and/or enhance early detection and response. The adequacy of current regulations to address the underlying issues that contributed to this extensive loss were examined. The wording for a proposed bylaw was developed to reduce the risk from such fires affecting adjacent buildings and endangering the occupants of those buildings.

**CMHC Project Officer :** Brian Eames

**CIDN :** 2423 0200001

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## INVESTIGATION OF SMOKE CONTROL IN HIGH-RISES BY POSITIVE PRESSURE VENTILATION

A research project has been initiated to study the use of positive pressure ventilation (PPV) systems to contain and expel smoke from high-rise buildings during a fire emergency. PPV systems have been used in the U.S. in low-rise buildings. The system consists of a portable, high velocity fan which is used by the fire department to clear smoke from buildings in order to facilitate access to the fire and to aid in occupant evacuation. Preliminary studies have been conducted in multi-unit residential buildings but not in cold climates where stack effect may continue to dominate smoke movement. The research program is the result of a joint venture between CMHC, the City of Ottawa Fire Department and the Fire Laboratory of the Institute for Research in Construction of NRC. The ability of PPV to contain and clear smoke from exitways in high-rise buildings will be evaluated at the Fire Laboratory's full scale test building under both summer and winter conditions. If successful, PPV may offer Fire Departments an effective, lower cost, life and property saving tool.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1983 0200002

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### ASSESSING THE PARAMETERS FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS

This research project will determine the ventilation requirements for apartments. Equipment and systems will be evaluated in their ability to meet such requirements in the context of building design, occupancy type and recent experiences in the application of ventilation systems in multi-unit residential buildings. Design and installation recommendations will be created for use by building designers. Technology gaps (e.g.; the absence of appropriate equipment) will also be identified for the benefit of future research and development efforts.

**CMHC Project Officer :** Duncan Hill

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2271 0200001

**STATUS :** Ongoing Project

### CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS

The objective of this project is to undertake a field investigation of the ventilation and infiltration in a residential high-rise building. CMHC, in cooperation with the Institute of Research in Construction, will monitor indoor-outdoor air pressure regimes in a high-rise for a period of one year. Ventilation system performance will also be assessed. Pressure regime measurements, in conjunction with measured air leakage characteristics of selected assemblies, will be used to estimate real-time air movement across the building envelope. This information will add to the body of knowledge governing infiltration-ventilation regimes and resultant heat load calculations in buildings.

**CMHC Project Officer :** Duncan Hill

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1934 0200005

**STATUS :** Ongoing Project

### CMHC GARBAGE BAG AIRFLOW TEST. ABOUT YOUR HOUSE; CE33

It is difficult for householders or small contractors to estimate airflows in the home. Suitable measuring equipment is not available for householder's use and the airflow test equipment available for contractors is relatively expensive and unwieldy. One alternative test method is to time the inflation of a garbage bag to estimate duct flow. The flow vs time characteristic was approximately established by CMHC research over ten years ago. This research has refined and extended the garbage bag air flow test procedure. This About Your House document has been prepared on how to do the test. The test, while somewhat crude, is a good indicator of flow for both householders and contractors.

Ottawa: Canada Mortgage and Housing Corporation, 2001. 2 pages.

Order Number: 62288

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products and available on the Internet:  
<http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/index.cfm>

## DAWSON CITY DEMONSTRATION PROJECT - MONITORING

The objective of this project is to evaluate the state of the mechanical and monitoring system, conduct an on-site inspection in Dawson City and develop a proposal for monitoring and analysing the system's performance.

**CMHC Project Officer :** Mark Holzman

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1676 0300005

**STATUS :** Ongoing Project

## NORTHERN HEATING AND VENTILATION SYSTEMS

The North lacks sufficient ventilation in many of its residential buildings which result in shortened building lifespans and negative health impacts on the occupants. There are known Northern ventilation options - some documented and tested to a greater extent than others. Existing ventilation systems need to be evaluated for appropriateness for use in new construction and renovation in the varied climatic regions of the North (Labrador, Nunavik, Nunavut, NWT and Yukon), and information on new or better options needs to be identified. This study will produce a single, simple, but comprehensive document outlining ventilation options to enable communities, homeowners, builders and renovators to make informed choices.

**CMHC Project Officer :** Aleta Fowler

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2420 0200001

**STATUS :** New Project

## PART-LOAD AND FROSTING CONTROL FOR ROTARY ENERGY WHEELS USED IN RESIDENTIAL BUILDINGS

The objective of this research is to determine the performance of rotary energy wheels, also called enthalpy wheels, for ventilation air exchange in residential buildings while subjected to a wide range of operating conditions.

**CMHC Project Officer :** Duncan Hill

**Division :** External Research Program

**Grant Recipient :** Robert W. Besant

Dept. of Mechanical Engineering, University of Saskatchewan

57 Campus Drive

Saskatoon, Saskatchewan S7N 5A9

**AVAILABILITY :** Publication is not available

**CIDN :** 2007 0200001

**STATUS :** Ongoing Project



## PERFORMANCE ASSESSMENT OF THE LEBRETON FLATS DISTRICT HEATING SYSTEM.

The Lebreton Flats district heating system, installed 20 years ago, is one of few examples of low temperature district heating systems in North America. The availability of fuel consumption and maintenance records for the system allows for an assessment of the performance of the system over the last 20 year period. It will also allow for a comparison of the district system with more conventional heating system options. Monitoring will be undertaken to assess the performance of the plant. Recommendations regarding system performance, potential upgrades and future operation, maintenance needs and other ownership/management arrangements will be made.

**CMHC Project Officer :** *Duncan Hill*

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2134 0200001

**STATUS :** Ongoing Project

## REDUCTION OF AIR INTAKE CONTAMINATION OF HIGH-RISE RESIDENTIAL BUILDINGS (ERP)

In the study, entitled, 'Reduction of Air Intake Contamination of High-Rise Residential Buildings', buildings will be tested to determine optimal placement of air intake grilles for HVAC systems. The placement determination will be based on water flume tests and modeling of air movement around high-rise buildings given confounding factors such as the height and proximity of neighboring buildings. A literature survey of relevant research on air intake grille location and contamination potential will also be performed.

**CMHC Project Officer :** *Duncan Hill*

**Division :** External Research Program

**AVAILABILITY :** Publication is not available

**CIDN :** 2305 0200009

**STATUS :** New Project

## THERMOSTAT SURVEY OF HOUSES WITH HYDRONIC, IN-FLOOR HEATING

This project surveyed survey 50 homes with hydronic in-floor heating and 25 control homes to determine if houses with in-floor heating have lower thermostat settings than those of houses with other types of heating systems. Lower home temperatures would reduce energy consumption. Sales literature for hydronic heating sometimes makes this claim. The field work revealed that houses with in-floor hydronic heating have thermostat settings similar to houses with other heating systems, and that there are no energy savings that can be attributed to lower thermostat settings for hydronic in-floor heating.

**CMHC Project Officer :** *Don Fugler*

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2396 0200003

**STATUS :** Ongoing Project



## BC MOISTURE PROBLEMS - ENVELOPE DRYING RATES EXPERIMENT

Findings from the 'Survey of Building Envelope Failures in the Coastal Climate of British Columbia' revealed that the construction of walls with face seal or concealed barrier systems does not promote rapid drying of wall assemblies once the moisture has saturated the moisture barrier and passed into the sheathing. The solution to promote drying of the wall assembly has been to introduce an air cavity behind the claddings. The objective of this project is to identify, through laboratory work, a range of cavity and vent configurations which will provide wall drying capability characteristics necessary to deal with the coastal British Columbia climate. In addition to the vents, the effect of insulation, vapour barrier, type of building paper and type of cladding will be investigated. A draft report is being reviewed by the steering committee. The final report will be available early in 2001.

**CMHC Project Officer :** Mark Salerno, Silvio Plescia

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1816 0300009

**STATUS :** Ongoing Project

## BEST PRACTICE GUIDE - FIRE AND SOUND ASSEMBLIES FOR MULTI-FAMILY BUILDINGS

This document, targeted at designers of multi-family buildings, will provide the latest information on CMHC research into fire and sound partitions, floors, flanking, plumbing noise, etc. Construction details for fire and sound assemblies will be detailed. The document is being produced in collaboration with the NRC/IRC.

**CMHC Project Officer :** Ken Ruest

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1804 0200003

**STATUS :** Ongoing Project

## BEST PRACTICE GUIDE - WOOD FRAME ENVELOPES IN COASTAL CLIMATES OF BRITISH COLUMBIA

To revise the best practice guide - wood frame envelopes in coastal climates of British Columbia. A steering committee has been formed to recommend and evaluate the changes to the BPG. A consultant has also been retained to draft the changes. The changes have been received and will be circulated to the steering committee for approval.

**CMHC Project Officer :** Jacques Rousseau

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2378 0200002

**STATUS :** New Project

## BEST PRACTICE GUIDE FOR CURTAIN WALLS

The objective of this project is to develop a practical, advisory document for designers, architects and engineers, and manufacturers, related to curtain wall systems in housing applications. The curtain-wall is a well developed system in commercial applications but it requires special treatment when used in housing. The project will be conducted in partnership with curtain wall manufacturers and installers and their associations. This Guide will be produced as a joint publication through a collaborative project with Public Works Government Services Canada. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to curtain walls, construction details in AutoCAD format, outline specifications and additional sources of information and references. The anticipated release date for the product is October 2001.

**CMHC Project Officer :** Luis de Miguel

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2216 0200001

**STATUS :** New Project

## BEST PRACTICE GUIDE FOR EXTERIOR INSULATED FINISHED SYSTEMS (EIFS)

The objective of this project is to develop a practical, advisory document for designers, architects and engineers, and manufacturers, related to EIFS in residential applications. The project will be conducted in partnership with EIFS manufacturers and installers and their associations. This Guide will be produced as a joint publication through a collaborative project with the EIFS Council of Canada and the BC Wall and Ceiling Association. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to EIFS, construction details in AutoCAD format, outline specifications and additional sources of information and references.

Anticipated release date is October 2001.

**CMHC Project Officer :** Luis de Miguel

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2047 0200001

**STATUS :** Ongoing Project

## BETTER BUILDING GUIDE TO INNOVATION IN THE DESIGN AND CONSTRUCTION OF HIGH-RISE RESIDENTIAL BUILDINGS

The objective of this project is to coordinate and edit the work relating to updating the "Better Building Guide to Innovation in the Design and Construction of High-Rise Residential Buildings" and to update the text, references and illustrations of the following four sections: Enhancing Envelope Design, Enhancing Energy Performance, Enhancing Indoor Air Quality and Enhancing Environmental Performance.

**CMHC Project Officer :** Sandra Marshall

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 0840 0306020

**STATUS :** New Project

## BREEAM GREEN LEAF ECO-RATING PROGRAM: CMHC MULTI-RESIDENTIAL BUILDINGS ASSESSMENT PILOT: FINAL REPORT

There are many reasons for measuring the environmental performance of buildings, chief among them being that it can help building owners decide where to put their retrofit dollars to improve their buildings and reduce operating costs.

BREEAM/Green Leaf is an environmental assessment protocol that was developed in response to the need in the marketplace for a less expensive methodology that could be partially conducted in-house. This makes it an appropriate introductory whole-building, comprehensive energy and environmental assessment for managers of multi-residential buildings. The assessment is based on an investigation of building performance and management practices by use of a checklist and walk-through survey. The data is then used to generate a report, which provides a building rating and a list of recommendations to improve the building and management performance. The methodology originated in Canada and was developed by ECD Energy and Environment Canada and Terra Choice. It combined the BREEAM set of environmental issues with the Green Leaf Eco-Rating procedure.

CMHC commissioned the environmental assessment of six high-rise multi-residential buildings, using the BREEAM Green Leaf assessment methodology. The objectives of the pilot were:

- To find out how well the six buildings apply healthy housing principles
- To obtain client feedback on environmental issues, including healthy housing principles.
- To obtain client feedback on the value of the environmental assessment.
- To find ways to better reflect healthy housing principles in the assessment methodology.

Six detailed, individual building assessment reports were undertaken. This report summarizes the results of the findings and the user survey.

*Prepared by ECD Energy and Environment Canada Ltd. CMHC Project Officer: Sandra Marshall.  
Ottawa: Canada Mortgage and Housing Corporation, 2001. 55 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## BRITISH COLUMBIA HIGH-RISE ENVELOPE DETAILS STUDY

In recent years, there have been significant efforts to understand and resolve moisture ingress and deterioration problems associated with wood-framed, low-rise building construction. Currently, this problem is acute in some wood-frame condominiums in the Lower Mainland of British Columbia. There are indications that the high-rise stock may also be experiencing similar moisture problems. The objective of this project is to examine the files of a sample of approximately forty buildings to assess whether the high-rise stock in the coastal climate of lower mainland BC is experiencing significant moisture related problems. The project will not estimate the extent of a potential problem. The project will focus specifically on envelope details and envelope systems that have failed, rather than building failures. Envelope types and components under review will include window/wall assemblies and light-gauge steel stud (back-up) wall assemblies with stucco, masonry and EIFS cladding systems. The work is scheduled for completion in the summer of 2001.

**CMHC Project Officer :** Mark Salerno, Silvio Plescia

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2234 0200

**STATUS :** Ongoing Project



## BUILDING ENVELOPE TEST HUT IN VANCOUVER B.C.- FEASIBILITY STUDY

Building envelope failures in the wet coastal climate of British Columbia along with a rising rate of moisture failures worldwide, require prompt attention to understanding causes and finding solutions. A Building Envelope Test Hut is proposed as a means to evaluate and understand the performance of claddings and exterior wall systems in the 'real' coastal climate conditions of the BC lower mainland and to identify construction practices, techniques and technologies, allowing for cost-effective long-term durability and performance of the exterior envelope. The objective of this project is to undertake a study to evaluate the feasibility of building, operating and maintaining a research test facility in Vancouver and to identify organizations/institutions interested in championing this research facility. This is a joint venture between Canada Mortgage and Housing Corporation and the Homeowner Protection Office.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2384 0200001

**Division :** Research Division

**STATUS :** Completed

**AVAILABILITY :** Publication is not yet available

## BUILDING FAILURES UPDATE 2000 - HIGH-RISE CONDOMINIUMS STUDIES

The purpose of this project is to provide CMHC with information (text, photos and drawings) to document building failures in high-rise condominium buildings in Ontario. The report will tabulate and compare findings from the CMHC/ONHWP 1990 document 'Construction Problems in Multi-family Residential Buildings'.

**CMHC Project Officer :** Luis de Miguel

**CIDN :** 1782 0300022

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## CASE STUDY OF A SUCCESSFUL INNOVATIVE MULTI-UNIT RESIDENTIAL BUILDING: A COMPENDIUM OF RESEARCH OF THE CONSERVATION CO-OP BUILDING

In 1995, a multi-unit residential building, the Conservation Co-op, was constructed that embodied as many environmentally sound concepts and technologies as was possible within the confines of an extremely tight budget. The objective of the development team was to provide affordable housing with minimal environmental impact, enhanced durability and superior occupant health and comfort. After five full years of occupancy, Canada Mortgage and Housing Corporation initiated a review of the performance of the building, particularly with respect to energy and water consumption, indoor air quality and the operational experience with many of the "green" innovations included in the building. The review revealed that the enhanced insulation levels, high efficiency space and domestic hot water heating appliances, low E windows, and heat recovery ventilation were economically sound choices. It also illustrated the costs associated with continuous ventilation strategies and the need for more efficient fan-motor set technologies and distribution systems. Many of the "green" features met, or exceeded expectations while others failed altogether. Overall, the building is a successful project as it managed to incorporate many environmentally sound design and construction practices and its experiences are readily available to others considering similar projects.

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

This compendium contains the research projects conducted to assess the performance of the Conservation Co-op and the degree to which the original goals of the project were met. The research reports contained herein document annual operating energy and water use, embodied energy, and water reclamation efforts. The Compendium is prefaced with a summary paper that documents all of the innovative aspects of the building and provides an overview of the projects successes and where improvements could be made. Further information is also available on the CMHC's web site [www.cmhc-schl.gc.ca/research/highrise](http://www.cmhc-schl.gc.ca/research/highrise) under the title Building Innovation.

Compiled by Duncan Hill, Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2001.

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA

The number and characteristics of condominiums in Canada are unknown. This project will review Statistics Canada data files to estimate the number of condominiums in Canada, their location, age, number of stories and number of suites. This information will be used to supplement the CMHC Rental Market Survey in order to estimate the overall population of multi-unit residential buildings in Canada. This information will also be used to determine the data requirements for a database of multi-unit buildings that describes the physical characteristics and energy consumption patterns of this class of buildings. Such a database is necessary to establish energy retrofit guidelines for multi-unit residential buildings.

The review by STATSCAN has found that the number of condominium buildings in Canada may be determined through building permit information available from STATSCAN files since 1970. STATSCAN is in the process of compiling this information to estimate the condominium building population.

**CMHC Project Officer :** Duncan Hill

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2277 0200001

**STATUS :** Ongoing Project

## CONDITION SURVEY OF CONDOMINIUMS IN THE GREATER TORONTO AREA (GTA)

This project's objective is to carry out a condition survey of condominiums in the Greater Toronto Area. This project will be carried out in two phases. Phase 1 focuses primarily on data collection and development of research methodologies for examining topics related to both physical and social issues. Phase 2 focuses on conducting the surveys and completing the analysis of the state of repair of the buildings.

**CMHC Project Officer :** Sandra Marshall

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2161 0200002

**STATUS :** New Project

## CONVERSION OF HIGH-RISE BUILDINGS TO RESIDENTIAL USE

The project will survey design and construction professionals and property managers of existing converted buildings across Canada to determine the extent and nature of technical problems which were encountered in the design and construction phases of the conversions; to determine the perception of property managers as to the concerns of the occupants; to determine the technical problems which have arisen as a result of these conversions; and to determine if there were any attempts to improve energy use performance or to introduce features to improve the sustainability of these buildings. Selected building would be documented as case studies in CMHC's Better Buildings/Innovative Buildings information series. The research report on this study is expected to be completed in 2001.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2397 0200

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## CONVERSION OF NON-RESIDENTIAL BUILDINGS TO MULTI-RESIDENTIAL USE

This cross Canada study is investigating the technical problems relating to the conversion of non-residential buildings to residential use. It will also address the issues which influence affordability in conversions to affordable housing indicating their potential to impede or encourage this housing. Case studies will be developed to show how these technical issues were overcome, with cost breakdowns.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2242 0200001

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## FIRE AND ACOUSTICAL PERFORMANCE OF FLOOR ASSEMBLIES - PHASE II

A continuation of an earlier project, this phase will be carried out over 4 years with a total budget of \$2.2 million. A dozen industry and government partners have formed a consortium with the National Research Council of Canada to complete testing of several types of assemblies for residential construction. Results will be incorporated in the National Building Code of Canada. Both full and small scale fire and sound testing will be carried out. A large database will be developed which designers and builders can use for reference. Particular attention will be given to assemblies likely to just obtain an STC 50 rating.

**CMHC Project Officer :** Luis de Miguel

**CIDN :** 2375 0200001

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available



## HIGH-RISE RENTAL RETROFIT COSTS AND IMPACTS

The recently completed assessment of repair needs for high-rise rental apartments in York and Toronto showed that about 9% of apartment buildings can expect very high repair costs. With the City of Toronto, this study would look at the problems faced by the owners and occupants of these buildings with high-cost-to-repair to determine the factors which have led to these incipient high repair costs and to propose possible avenues of resolution to these burdens. Examples of buildings which have had to deal with these problems will be sought as case studies. It is expected that the study will provide property managers with evaluation tools to improve their understanding of conflicting durability and financial constraints. The study is scheduled for completion by the end of 2001.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2231 0200

**Division :** Research Division

**STATUS :** Planned

**AVAILABILITY :** Publication is not available

## IDEAS HIGH-RISE CHALLENGE

The IDEAS Challenge is intended to demonstrate the benefits of innovative design and technology in the operation of high-rise residential buildings. The Challenge focuses on five aspects of building design: envelope durability, energy efficiency, indoor air quality, environmental conservation and accessibility. One project in Montreal is built and monitoring is being carried out. Acoustic details have been tested. Two booklets are available, one that describes the IDEAS Challenge and the features of the five finalist projects and another which is a "Better Building" guide to innovation in the design and construction of high-rise residential buildings. The design process of a building in Dundas, Ontario which is exploring the adaptation of the IDEAS Challenge goals and details of CMHC's Best Practice Guide, is being documented. A project in Edmonton is also ongoing.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 0840 0300

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## IN-SITU MONITORING OF EXTERIOR WALL ASSEMBLIES - MONTREUX RESIDENCES

This project's objective is to monitor the performance of the exterior wall assemblies at the building complex, known as Montreux Residences, for temperature, relative humidity, moisture content and air pressure differentials.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2254 0200001

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## IN-SITU PERFORMANCE OF THE EXTERIOR WALL SYSTEM

The objective of this project is to monitor, assess and document the performance of a residential low-rise, wood-framed development which incorporates rainscreen design technology, to analyze data to determine the effectiveness of wood frame rainscreen wall assemblies and to identify the relative performance of building envelope features that provide improved performance or minimizes the risk of envelope problems.

**CMHC Project Officer :** *Silvio Plescia*

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2254 0200002

**STATUS :** New Project

## INVESTIGATION PROTOCOL FOR EVALUATION OF POST-TENSIONED BUILDINGS

The scope of work will consist of soliciting input from stakeholders, exchange of test results obtained to date and development of a protocol to assist in planning and execution of post-tensioned building assessments.

**CMHC Project Officer :** *Silvio Plescia*

**Division :** External Research Program

**AVAILABILITY :** Publication is not available

**CIDN :** 2305 0200015

**STATUS :** New Project

## LEAK-PROOFING WINDOWS, PHASE I - FABRICATION, INSTALLATION AND MAINTENANCE

The Survey of Building Envelope Failures in the Coastal Climate of British Columbia revealed that exterior moisture penetration through and/or around windows (at window wall interfaces) is a significant contributor to the envelope moisture problem. The objective of this project is to undertake a study which identifies the nature and causes of moisture ingress problems associated with windows and window to wall interfaces. The study will identify and recommend solutions for addressing water penetration problems associated with all aspects of the window manufacturing, design, installation and in-service maintenance.

**CMHC Project Officer :** *Silvio Plescia*

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2285 0200001

**STATUS :** New Project

## LEAK-PROOFING WINDOWS, PHASE II - A REVIEW OF STANDARDS TESTING AND CERTIFICATION

The Survey of Building Envelope Failures in the Coastal Climate of British Columbia revealed that exterior moisture penetration through and/or around windows (at window wall interfaces) is a significant contributor to the envelope moisture problem. This objective of this research project will be to conduct a detailed review of the Canadian Window Standard CSA A440, together with all its attachments, to review the test requirements related to moisture penetration as outlined in the standards, and to review, assess and evaluate the window certification programs and processes.

This research project will identify recommended solutions and opportunities for alleviating these moisture problems into the wall assembly from the window/wall interface.

The Canadian Window Standards Committee is considering the adoption of and harmonizing with the North American Fenestration Standards (NAFS). This project will also attempt to consolidate the affects that NAFS may have on the performance of windows if adopted by the window standards committee.

**CMHC Project Officer :** *Silvio Plescia*

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2425 0200001

**STATUS :** New Project

## LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING

This project will describe load profiling work underway in Metro Toronto Housing Corporation multi-unit residential buildings. The project will characterize thermal, electrical power and water requirements in the apartment buildings and will also identify technical issues encountered in load monitoring and data interpretation. This project is being used as a pilot project to identify the factors that will have to be considered in a larger project being planned by CMHC and Natural Resources Canada to assess the energy and water load profiles in low and high-rise housing.

**CMHC Project Officer :** *Duncan Hill*

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2201 0200001

**STATUS :** New Project

## MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS

The purpose of this project is to develop knowledge to assess the impact of various wall design and indoor-outdoor environmental conditions on the durability and energy efficiency of new and retrofitted high-rise residential and commercial building systems. The hyglRC heat, air and moisture model developed by the Institute for Research in Construction is being used to model common wall systems. Retrofits to improve the airtightness and insulation levels in the walls were developed and are being applied to the basic wall systems. The hyglRC model will simulate heat, air and moisture conditions within the retrofitted walls to determine how the retrofits affect the durability of the wall system. This information will be used as a means to confirm the integrity of several specific retrofit measures developed for high-rise wall structures before they are recommended to the building industry.

**CMHC Project Officer :** *Duncan Hill*

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1934 0200003

**STATUS :** New Project



## MONITORING INNOVATIVE MECHANICAL AND ELECTRICAL SYSTEMS

The innovative mechanical and electrical energy producing systems in a multi-unit residential buildings project in Toronto were monitored and assessed to determine their economic viability. The project involved the assessment of the buildings cogeneration, space heating, absorption chilling, domestic hot water and ventilation systems and a review of natural gas and electricity use. The cost of energy provided to the building by the cogeneration system in terms of fuel consumption, maintenance expenditures, avoided electrical use and other considerations was determined. An inspection of the individual space conditioning systems within the suites was also performed. The findings of the investigation showed that the operation costs (fuel use, maintenance and repair) of the cogeneration system was not economically viable. Key findings include the observation that the system was not making full use of the heat generated by the cogeneration systems. The report estimated that even if all of the heat was recovered from the cogeneration system, the benefit of the system to the building's owners would be marginal. Given that the building embodies some of the most advanced technologies that allow for energy efficiency, cascading and recovery, operation costs should have been low relative to conventional buildings.

CMHC coordinated a meeting of the project developer, engineering design team, cogeneration system manufacturer, utility representative and industry experts and stakeholders to review the situation in the building and to determine whether or not the performance of the building systems could be improved. The outcome of the meeting was that a review of the utility meters and billing history should be undertaken to confirm that the basic information being used to assess the performance of the building is correct. CMHC is working with Ontario Hydro Energy and Admic Controls to develop a metering review plan and evaluation.

**CMHC Project Officer :** *Duncan Hill*

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1260 0800001

**STATUS :** Ongoing Project

## MONITORING THE PERFORMANCE OF AN EIFS RETROFIT ON A 15 STOREY APARTMENT BUILDING

Morrison Hershfield Limited was retained by Canada Mortgage and Housing Corporation to monitor the performance of the rehabilitation of a 15-storey, 112-unit apartment complex located in Toronto. A major phase of the rehabilitation involved installation of exterior insulation and finish system (EIFS) rainscreen cladding over the existing brick masonry walls. The monitoring program included analysis of temperature, moisture content and air pressure measured at five locations over a winter season.

The original wall construction was clay brick masonry with concrete block backup, expanded polystyrene insulation, and plaster interior finish. The EIFS cladding consisted of acrylic stucco lamina installed over expanded polystyrene insulation that was adhered to the brick masonry using a trowel-on, proprietary material. The trowel-on material was intended to function as the air barrier and drainage plane. Vertical channels, which were located on the interior face of the insulation, were intended to drain rainwater that penetrated to the coating through drain blocks located every 5 stories.

The project objectives were:

1. To document the development of a building envelope retrofit strategy for a residential high rise building.
2. To monitor, assess and document the performance of a residential high rise building envelope retrofit.
3. To assess the degree to which the monitoring protocol can be implemented as part of regular operation and maintenance activities for new and existing buildings.

4. To assess the potential for the development of a commercially viable, building envelope performance monitoring protocol.

The objective of the monitoring program was to establish the performance of the retrofit wall with respect to heat, air and moisture control.

Prepared by Morrison Hershfield Limited. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2000. (70 pages)

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### OPERATING AND MAINTENANCE BOOKS FOR MECHANICAL AND ELECTRICAL SYSTEMS IN MULTI-UNIT BUILDINGS

Two publications, currently in 'draft' stage, on improving the operating performance of modern residential building systems have been developed. The first document, for owners and managers, links good operating practices with desirable investment strategies. The second, for building operating and maintenance staff, updates information on mechanical and electrical systems and incorporates preventative maintenance checklists for multi-unit residential buildings.

**CMHC Project Officer :** Duncan Hill

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1774 0300004

**STATUS :** Ongoing Project

### PERFORMANCE MONITORING OF A BRICK VENEER/STEEL STUD WALL SYSTEM: PHASE 4 RESULTS: REVISION I

The Brick veneer/steel stud (BV/SS) wall system has become very popular over the last 20 years, however, the rapid adoption of this wall system has preceded the development of adequate design and construction standards. This situation has led to concerns regarding the long term safety, serviceability and durability of BV/SS wall systems. Therefore, Canada Mortgage and Housing Corporation (CMHC) has been evaluating BV/SS wall systems over the past several years by commissioning studies by various consultants, including Keller Engineering Associates Inc. (KEA).

Phase 4 of this study by KEA involved a fourth year (in 1996 and 1997) of in-situ performance monitoring of a BV/SS wall system, with respect to air and moisture movements as well as temperature gradients. In an attempt to improve venting of the wall cavity, vent holes were cut into every second vertical mortar joint in the top course of the monitored brick veneer section. The performance of a test wall was monitored using various temperature, moisture and air pressure sensors that were connected to an automatic data logging system. Even though the BV/SS wall system is typical of current practices and workmanship was mostly satisfactory, the results of the study demonstrate that performance problems exist that may lead to significant distress over the long term. The more serious performance problems identified in this study are mainly due to design weaknesses, illustrating the need for improved design and construction standards.

Prepared by Keller Engineering Associates Inc. CMHC Project Officer: Jacques Rousseau. Ottawa: Canada Mortgage and Housing Corporation, 2001, c1999. (69 pages)

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



## PERFORMANCE MONITORING OF AN INNOVATIVE HIGH-RISE RESIDENTIAL BUILDING

A high-rise residential building is being constructed in Dundas, Ontario that will utilize many innovative design strategies, products and systems to improve durability, indoor environment, energy and water efficiency, resource use and environmental impact. In order to assess the cost-benefit of each measure, CMHC, in cooperation with Natural Resources Canada, will be undertaking an extensive year long monitoring program in the building. Energy and water consumption, building envelope, indoor air quality and ventilation system performance will be assessed in order to better understand the technologies adopted in the project. A report will be issued that describes the building project, the individual measures adopted to improve performance, and the impact on the overall performance of the building.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1602 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## QUALITY ASSURANCE PROTOCOL TEST DRIVE

"Quality by Design" was commissioned as the Quality Assurance Protocol by Canada Mortgage and Housing Corporation in order to establish a management system for the assurance of quality of the exterior of multi-storey wood frame buildings located in the coastal climate of British Columbia. This is part of the initiatives undertaken by the Building Envelope Research Consortium, of which CMHC is a member, to address the "leaky condo" issue as it pertains to new construction. A Quality Assurance Protocol is a set of recommendations and guidelines which, if followed, will assure an improved level of quality in design, construction and maintenance.

The original "Quality by Design" was published in January 1999. This current edition has been refined extensively based upon ongoing input from a wide variety of sources, and in particular, the document has been refined based upon applying it to a real project.

*Prepared by Pro Pacific Architecture Limited. Principal investigators for the project were Brian Palmquist and William A. Gies, assisted by quality systems consultant Arc Rajtar. The "test drive" revisions were prepared by Brian Palmquist. CMHC Project Officers: Jacques Rousseau and Mark Salerno. Ottawa: Canada Mortgage and Housing Corporation, c2000.*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## RAIN PENETRATION CONTROL: APPLYING CURRENT KNOWLEDGE

Water is the most significant factor in the premature deterioration of buildings. It can damage some materials directly and reduce the effectiveness of insulation. It is the major factor in the corrosion of metals, the chemical breakdown of many organic materials and the growth of mold and rot. Controlling water penetration, as well as its location, duration and phase (vapour, liquid or solid), is often the most critical factor in achieving long-term performance of a building envelope assembly.

This document focuses primarily on rain penetration control in walls and windows. Other wetting mechanisms include condensation and exposure to ground water. Moisture can be removed from a building assembly through drainage, by diffusion or venting (convective air change) to a drier indoor or outdoor environment. Most building assemblies and materials have some tolerance for infrequent and short duration wetting. Some infrequent passage of water to the inside is a minor inconvenience rather than a disaster. Determining how much effort and expense can be justified to minimize water penetration or evaluating what assembly types are appropriate for a particular building application and location is an exercise in judgment and risk management.



## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

Following a discussion of several approaches to water penetration control in walls, including architectural design, there is a detailed explanation of the rain-screen principle and its application to contemporary buildings. Designers are further challenged to incorporate the Pressure Equalized Rain-screen (PER) principles. The PER system uses compartment seals to divide the cavity into a series of chambers in addition to the elements of a simple rainscreen.

This limits lateral air flow in the cavity and increases pressure equalization, ultimately reducing the amount of water entering the interior wall. Remarkably, in pressure equalized rainscreen walls or joints, leakage is reduced by making bigger holes in the outside surface. This is counterintuitive.

To help design rainscreen curtain walls CMHC developed the "RainScreen" software. It allows designers to vary the parameters of their rain screen system and graphically see the resulting dynamic pressure distribution on cladding and air barrier (backpan) layers. Its mathematical engine is based on the CMHC report "Rainscreen" by Jacques Rousseau.

"RainScreen 2.1" adds many new features and an easy GUI interface, using either Windows (3.1 or 95) or Macintosh systems.

The "RainScreen v2.1" software may be downloaded free from CMHC at:  
<ftp://ftp.cmhc-schl.gc.ca/highrise/rainscreen.html>.

Ottawa: Canada Mortgage and Housing Corporation, 2001, c1999.

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## REMEDICATION OF MOISTURE TROUBLED WOOD FRAMED BUILDINGS IN THE COASTAL CLIMATE OF B.C.

This project researched, conducted and prepared diagnostics and recommended procedures for the cost effective rehabilitation of leaking condominiums in the lower mainland of B.C. The project developed a standard method of damage assessment, and outlines the rehabilitation steps including considerations for technical issues, code compliance, financial implications and practicality of repair. Two documents are being finalized, one for consultants, and the other for property managers and owners of condominiums or multi-unit residential buildings. The project has been completed and a draft of the publication is available.

**CMHC Project Officer :** Ken Ruest, Mark Salerno

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2061 0200

**STATUS :** Ongoing Project

## REPAIR AND RETROFIT CASE STUDIES FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is documenting repair and retrofit activities in multi-unit residential buildings. The first 30 case studies will document building characteristics, the type of problems that prompted the repairs and retrofits, costs, benefits, etc. A wide range of case studies will be included to reflect regional repair and retrofit priorities. The studies will be useful for other members of the multi-unit residential building industry to refer to when considering similar projects. An information template that can be used as a guideline for the type of information that should be extracted from a repair or retrofit project in a multi-unit residential building has been developed. CMHC is currently soliciting the building industry for case studies and will retain consultants to provide the necessary documentation. A compendium of case studies will be assembled and made available.

**CMHC Project Officer :** Luis de Miguel

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1782 0300001-7

**STATUS :** Ongoing Project

## REPAIR AND RETROFIT CASE STUDIES OF THE LOFTS CORTICELLI COMPLEX

A field project to review the condition of the solid masonry walls of a historic building in Montréal has been completed. The building, originally constructed in the 1800's, was converted to residential use in 1986. As a part of the renovation, the interior of the solid masonry brick walls was insulated with spray applied polyurethane foam and fibreglass batt insulation. As this type of insulation retrofit was thought to be responsible for the deterioration of solid masonry walls, CMHC initiated a project to assess the condition of the building envelope and all of the elements. The field survey found that the walls, after 14- 15 years of service, were in good condition. No conditions or symptoms were found that would lead to the conclusion that the application of the spray applied polyurethane foam and other finishing materials had, in anyway, undermined the integrity of the wall system. This finding is important as many older buildings in the urban areas of Canada are being renovated to residential use and exterior insulation retrofits are not possible for heritage or aesthetic reasons. While the finding of this study is specific to this one building, it appears that interior insulation wall retrofits may be possible as long as steps are taken to prevent the intrusion of moisture and air leakage from both interior and exterior sources into the wall assembly. Susceptible wall members, such as embedded wood structural members should be protected as well. CMHC will perform additional case studies of retrofitted solid masonry walls to provide a better understanding of the strengths and weaknesses of this form of renovation.

**CMHC Project Officer :** *Duncan Hill*

**CIDN :** 1782 0300020

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## TECHNOLOGY ROAD MAP FOR INTELLIGENT BUILDINGS TECHNOLOGIES

This objective of this project is to develop a road map for intelligent buildings technologies, considering the potential technological, societal and other developments that will affect the industry within the next five years.

**CMHC Project Officer :** *Sandra Marshall*

**CIDN :** 2388 0200001

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## TESTING OF DYNAMIC BUFFER ZONE (DBF) METHOD

This project's objective is to proceed with testing a Dynamic Buffer Zone (DBZ) method in the air space behind brick cladding. The DBZ consists of introducing mechanically dry, temperate air in the air space behind the brick cladding. The dry air absorbs the condensation and should increase the durability of the wall assembly. The wall will be monitored for a year.

**CMHC Project Officer :** *Luis de Miguel*

**CIDN :** 0411 0305002

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## HOME OWNERSHIP

### TECHNICAL ASPECTS OF SELLING NEW HOMES

The purpose of this initiative is to support a project being managed by the Professional Home Builders Institute of Alberta which is to develop a 12 to 18 hour interactive CD ROM course on "The Technical Aspects of Selling New Homes". The CD ROM course will be based on two existing courses and will include video clips, audio, graphics, text, self-tests and optional exams. The information contained in the CD ROM will be beneficial to home builders' new home sales staff, and to real estate sales agents who are involved in selling new homes. Also, new home buyers will be able to take the course to raise their awareness of the home buying process. The CD ROM will be searchable and would serve as an ongoing reference. A student guide will also be produced to compliment the course. The work is planned for completion by Summer 2001.

**CMHC Project Officer :** Darrel Smith

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2412 0200001

**STATUS :** New Project

**\*\* SEE ALSO:** *Homeownership Education and Counselling*, p. 75

## HOUSE CONSTRUCTION

### ALTERNATIVE WALL SYSTEMS FOR LOW-RISE RESIDENTIAL CONSTRUCTION

The purpose of this study is to compare various alternative wall systems for low-rise housing in use today. These systems will include insulated concrete forms, straw bale, structural insulated panels, stack wall, concrete block, post and beam, log, earth construction, engineered wood, and light gauge steel. The results of this study will be beneficial to those in the industry to help them make better informed decisions on choices between alternative systems. This study will take an inventory of and investigate the differences, benefits and limitations of the various building systems which are currently in use as compared to the typical wood-frame, stick-built construction of low-rise housing. It will consider the advantages and/or disadvantages of the various systems. The study will examine a number of the factors to be considered by a builder or homeowner to help them understand the differences between the available system choices so they may evaluate and select systems appropriate to their clients, house designs, trade practices and skills, and regions. The study will include reviews by representatives from each of the wall system industries. The anticipated completion date is late 2001.

**CMHC Project Officer :** Darrel Smith

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2119 0200

**STATUS :** Ongoing Project



## CD-ROM VERSION OF THE CANADIAN WOOD-FRAME HOUSE CONSTRUCTION

The purpose of this project was to design and develop a CD-ROM version of CMHC's Canadian Wood-Frame House Construction (CWFHC) publication complete with a number of multimedia enhancements and other special features such as video clips, animations and 4D illustrations. The CD ROM includes a number of "calculators" to help the user determine the specified snow loads for specific locations across Canada, and to select proper beam and joist sizes and spacings. It also includes the Glossary of Housing Terms with links to and from the text and illustrations in the Canadian Wood-Frame House Construction, to serve as an illustrated glossary. Other features of this product are:

- It is a web-based interactive CD-ROM;
- A full-text search engine allows the user to search for any term;
- Planning ahead and checking back notes appear throughout the text with links to illustrations and video footage;
- It is based on the National Building Codes; and
- It contains 144 high quality illustrations that can be optimized for printing.

The CD-ROM system requirements are as follows:

### For PC:

i486 , Pentium  
Microsoft Windows 95/ Windows NT 4.0  
32 MB RAM  
12 MB hard-disk space  
Netscape 4x or Internet Explorer 4x  
Adobe Acrobat Reader Version 4.0  
Apple QuickTime 4.0  
Microsoft Excel 97®

### For Mac:

Macintosh PowerMac G3  
Macintosh System OS 7.5  
64 MB RAM  
Netscape 4x or Internet Explorer 4x  
Adobe Acrobat Reader Version 4.0  
Apple QuickTime 4.0  
Microsoft Excel 98

The CD ROM is now available separately or packaged with a hard copy of the CWFHC.

Order number for CD-ROM only: 62237;	Price: \$64.95 + GST and handling charges
Order number for CD-ROM and Guide: 62234	Price: \$84.95 + GST and handling charges

By purchasing the CD-ROM + Guide package:

You will save \$5.00 off the price of purchasing them separately; and  
Have the guide as a handy on-site référence

For clients who wish to demo the product, they may call to receive a copy of the Canadian Wood-Frame House Construction demo CD-ROM.

**STATUS :** Completed

**AVAILABILITY :** CMHC Information Products

## COMPARING THE PERFORMANCE OF TWO-COAT VS THREE-COAT STUCCO

This project is being managed by CMHC's Prairie and Northwest Territories Business Service Centre in Calgary, in cooperation with the Alberta Housing Industry Technical Committee (AHITC). The research will use laboratory and field testing to compare the performance of two coat stucco commonly used in the Prairies and standard three coat stucco. If they perform similarly, building code changes may be recommended. The effects of stucco additives and mixtures will also be examined. Currently the contractor has completed the review of test procedures and is proceeding to the laboratory work. The field work that follows will involve testing samples of two-coat stucco removed from existing houses to verify their performance.

**CMHC Project Officer :** Don Fugler, Colin Crumb

**CIDN :** 2399 0200

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## CONTRACTOR TRAINING COURSE ON THE CONSTRUCTION AND RESTORATION OF DURABLE BUILDING ENVELOPES FOR RESIDENTIAL WOOD-FRAME BUILDINGS LOCATED IN THE LOWER MAINLAND OF BC AND VANCOUVER ISLAND

This is a partnership project between the Canadian Home Builder's Association of British Columbia (CHBA/BC), the Homeowner Protection Office (HPO) of B.C. and CMHC. The purpose of the project is to develop a course curriculum and course training materials to train general contractors and subtrades in building construction practices that would enable them to construct highly durable building envelopes for new residential wood-frame buildings located in the lower mainland of British Columbia and Vancouver Island and to restore and upgrade the envelopes of existing buildings. The end product will be a Trainer's Manual complete with all the necessary training aids, and a Participant's Manual. The course will be tailored to meet the needs of the residential construction industry and would use a full range of teaching methods to ensure that all participants absorb the information provided. The course development is expected to be completed by Summer 2001. CHBA-BC is in the process of finding industry partners to help fund the pilot of the course. The pilot will consist of three seminars over a six month period with up to 25 participants per seminar. CHBA-BC will be granted the exclusive right to deliver this course in the province of BC for a two year period.

**CMHC Project Officer :** Darrel Smith, Mark Salerno

**CIDN :** 2287 0200002

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## FEASIBILITY STUDY ON THE DEVELOPMENT OF A COMMISSIONING GUIDE FOR NEW HOUSES

The purpose of this project is to confirm the importance and determine the feasibility of developing a commissioning guide for builders and buyers of new houses. Commissioning of a new home could help confirm for the owner that all of the components and systems have been installed to operate as designed and intended. If developing such a guide is possible and desirable, the study would indicate necessary content, and identify possible options for its production. One option is that the guide become a part of CMHC's Home Owners Manual. The first draft of the feasibility study has been submitted for review and the final draft is anticipated to be completed later this Summer. Further action by CMHC will depend on the findings of the research.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2360 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### FEASIBILITY STUDY ON THE DEVELOPMENT OF A GUIDE FOR ENGINEERED WOOD I-JOIST FLOOR SYSTEMS

The purpose of this project is to confirm the need for and determine the feasibility of producing a generic guide for builders on the selection and proper installation of engineered wood I-joist floor systems. As a prerequisite to possibly developing a guide, the study will identify information required and available and effective ways that a guide could be produced. The first draft of the feasibility study has been submitted for review and the final draft is anticipated to be completed by Summer 2001. Should this study confirm the need, development of a generic guide could begin later in 2001.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2358 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### RESEARCH ON SOLUTIONS TO PYRITE-RELATED BACKFILL EXPANSION PROBLEMS

This study will draw up an inventory of the problems associated with the reactions of the pyrite (iron sulphide) contained in the backfill stone used under slabs in residential properties. Two hundred houses inventoried in three Montréal South-Shore municipalities will be visited under the CTQ-M200 protocol developed as part of the work of the Quebec technical committee on pyrite-related problems. The results of the study will identify possible causes and potential affordable solutions. The objective is to provide the industry with a more global vision of this new situation.

**CMHC Project Officer :** Jacqueline Meunier-Bureau

**STATUS :** Ongoing Project

**Division :** Research Division

**AVAILABILITY :** Publication is not available

## HOUSE CONSTRUCTION INDUSTRY

### TECHNOLOGY DISSEMINATION - A NEW APPROACH

Cost saving technologies are often slow to be adopted in Canadian house construction. This may partly be due in part to most contractors having limited abilities to undertake research and evaluation, and develop the competency to use such advances. The goal of this External Research Program work is to devise an information dissemination technique which focuses on the process of innovation introduction rather than the innovations themselves. It is felt that by "reasonably demonstrating" the value of various innovations to subcontractors, there will subsequently be a "natural" spread to other projects as the subcontractors utilize their newly acquired cost-effective techniques to gain a competitive advantage. This project report will be of interest to researchers, builders and developers who wish to integrate new and improved building process onto the mainstream of the construction industry. A project report should be available by summer 2001.

**CMHC Project Officer :** Thomas Green

**CIDN :** 2144 0200016

**Division :** External Research Program

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available



## HOUSING

### IDENTIFICATION OF GAPS IN DISASTER INFORMATION RELATED TO HOUSING

This short survey project will assemble and review existing housing information related to 'disasters' to assess if and where additional research may be required. The review will concentrate on housing and housing issues, and will be restricted to either Canadian sources or other sources in areas of similar climate or construction techniques. The contractor or an outside reviewer will assess the suitability of the information for the intended audience.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2417 0200002

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## HOUSING DESIGN

### MONTREAL: A GREAT TRADITION OF MEDIUM-DENSITY HOUSING

This project aims to highlight the adaptation processes of housing and building types throughout the various phases of the evolution of "plex" formulas (duplex, triplex, fourplex, fiveplex ...) in Montreal over four construction cycles between 1866 and 1935.

**CMHC Project Officer :** Mark Holzman

**CIDN :** 1455 0200001

**Division :** External Research Program  
Research Division

**STATUS :** Ongoing Project

**Grant Recipient :** David B. Hanna, Université du Québec à Montréal  
P.O. Box 8888, Station CV  
Montréal, Quebec H3C 3P6

**AVAILABILITY :** Publication is not available

## INDOOR ENVIRONMENT

### DEVELOPMENT OF A PROCEDURE FOR ESTIMATING AIR CHANGE RATES USING A SPECIFIC ODOUR AS A TRACER GAS

When householders complain about poor indoor air quality or high energy costs, the rate of outdoor air infiltration is critical in analyzing their problem. If the rate is very high, this could lead to high heating costs. If the rate is low, poor air quality may result and adding a ventilation system would be useful. However, there is no simple quantitative way for residents to estimate ventilation rates in their own house. This research project aimed at developing a procedure for estimating of air change rates, using a specific odour as a tracer gas. The research has not been particularly successful. The contractor selected a convenient and available odour source, wooden matches, but their usage as a whole house test procedure turned out to be impractical. They may be more suitable for room air change testing. Further testing is required (but not planned) in order to evaluate the use of odours to determine air change rates in small spaces.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2396 0200002

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## DEVELOPMENT OF A TEACHING MODULE ON INDOOR AIR QUALITY FOR PHYSICIANS

The Ontario College of Family Physicians, in collaboration with and funding from CMHC, is developing a teaching module on Indoor Air Quality which will form part of the curriculum in Environmental Health in Family Medicine. A module has been tested at a peer workshop for family physicians. The participants of this workshop will be delivering the module as pilots in their respective communities. Plans are underway to present the module at the teaching universities in Ontario. Distribution of the module in other provinces will also be explored. This project is an attempt to transfer housing information to consumers through health professionals. Physicians are in a unique position and authority and are the most suitable for communicating housing information and the health impacts of good indoor air quality.

**CMHC Project Officer :** Virginia Salares

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2128 0200001

**STATUS :** Ongoing Project

## HEALTHY INDOOR ENVIRONMENTS PHASE 2: CONSULTATION PROCESS

This is the second phase of the project "Towards the Use of Voluntary Initiatives for Achieving Healthy Indoor Environments in Canada" which was a 1998-99 partnership project led by Pollution Probe Foundation in which CMHC participated. Recommendations from the initial report include the development of a comprehensive multi-stakeholder strategy to address the Canadian indoor environment issue. This Phase 2 work, led by Pollution Probe in partnership with a number of government and industry stakeholders, involved the hosting of three regional consultations (Toronto, November 2000; Halifax, January 2001; and Vancouver, March 2001) and a web based database discussion forum. The objective of phase 2 is to develop a vision of what is possible in the field of healthy indoor environments, a strategy to achieve it, and multi-stakeholder commitment to realise that strategy. A final report for Phase 2 work is expected by spring 2001.

**CMHC Project Officer :** Thomas Green

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2383 0200001

**STATUS :** Ongoing Project

## INDOOR AIR POLLUTION FROM ATTACHED GARAGES

CMHC is contributing to a Health Canada/Environment Canada project investigating the infiltration of garage-based pollutants into houses. Twenty-five Ottawa houses have been tested to determine the leakage area between the house and the attached garage. Pressure differentials were recorded and pressure testing was repeated during the winter months. Further field testing took place in the winter of 1998/99, including modeling of the IAQ implications and monitoring of pollutant entry when the garage is occupied by a "calibrated" car. Modeling has given different results, and there is additional work to model the results a second time. Reports on various aspects of the project are being prepared by the agencies involved. CMHC will release a Research Highlight on the airtightness testing aspect of the project in summer 2001.

**CMHC Project Officer :** Don Fugler

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1910 0200002

**STATUS :** Ongoing Project

## INDOOR AIR QUALITY INVESTIGATION TRAINING

CMHC's Residential Indoor Air Quality (IAQ) Investigator Training exists to train qualified individuals to investigate homes for indoor air problems. Individuals who complete the training acquire the skills to inspect homes for IAQ problems and to provide informed advice to homeowners on how to correct these problems. As a private business, they offer their professional services to the public for a fee. Individuals interested in the program can contact the training coordinator (e-mail: joolsdev@mv.igs.net, telephone 613 756-0714) for admission requirements and application forms. Two dozen individuals have received their completion diploma and fifty are in the field training phase. For referral purposes, a list of diploma graduates is available from CMHC offices.

**CMHC Project Officer :** Virginia Salares

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1623 0300017

**STATUS :** Ongoing Project

## PRINCE EDWARD ISLAND BIRTH COHORT STUDY OF MOLD IN HOMES

This joint study between CMHC, Carleton University, Health Canada and others is examining a large sample of homes in Prince Edward Island to determine the biological exposure, house performance parameters and energy use characteristics of a statistically-representative set of houses occupied by newborn babies. Part of the study will follow the health of these babies to determine the degree to which damp and moldy houses result in increased infant health problems. A total of 233 houses have been tested at the end of the fourth year of the project. An additional 60 houses are to be tested during 2001. Due to the long term nature of this research, research reports have not as yet been issued.

**CMHC Project Officer :** Ken Ruest

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1618 0300001-2

**STATUS :** Ongoing Project

## RENOVATING THE HOME FOR ASTHMA: AN INTERVENTION STUDY

The purpose of this project is to study the relationship between air quality in housing and respiratory health in renovated housing. Health Canada, Carleton University and Natural Resources Canada are partners and will be represented in the project advisory committee. Funding is from CMHC, with contribution from the Program for Energy Research and Development (PERD). The methodology is similar to that of a completed pilot project which studied the effect of renovating the homes for indoor air quality on the asthmatic condition of the occupants. This project will look at 20 case studies of moldy houses selected from different parts of the country and renovated by their owners. Remediation of the houses will incorporate measures to improve their energy efficiency. The output will be a research report that will be of interest to builders and renovators, the general public, the asthmatic population, researchers and physicians. The study should be complete by late 2002.

**CMHC Project Officer :** Virginia Salares

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2157 0200001

**STATUS :** Ongoing Project



## RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY

CMHC is participating in an Industrial Research Chair in Health and Indoor Air Quality at Carleton University. The principal funding for this Chair is being provided by Paracel Laboratories, Morrison Hershfield Ltd., Health Canada, Kingston General Hospital, Carleton University and CMHC. The Chair, in collaboration with its partners, will develop more rapid and cost effective methods for measuring the types and amount of mold in buildings and exposures of the occupants, construct a database of cultures of molds found in moisture troubled buildings, prepare purified extracts of the molds for allergy diagnostic tests and undertake studies of the effects of these molds on lung cells. The output from this Chair would have far-reaching benefits for the general population in the clinical diagnosis of mold allergy and the mitigation of mold contaminated buildings. A five year research program of the Chair is currently being planned.

**CMHC Project Officer :** Virginia Salares

**CIDN :** 2269 0600

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## STUDY OF DISPLACEMENT VENTILATION SYSTEMS FOR RESIDENTIAL HOUSES WITH RADIANT FLOOR HEATING SYSTEMS

It is estimated that about 1% of Canadians are environmentally hypersensitive. These people suffer partial to total debilitation. Some of them require a home environment that is as free as possible from air-borne contaminants. Designing and constructing such houses are hampered by the lack of practical guidelines both for selecting suitable building materials and furnishings, and for designing and installing effective ventilation systems. The Canada Mortgage and Housing Corporation has recently designed and constructed a prototype house for environmentally hypersensitive individuals. It includes a range of features to help to achieve an acceptable indoor environment for these people at a minimal cost. These features include the use of commercially available low emission building materials and easily cleanable interior finishing, and a specially designed displacement ventilation system.

A joint project was established between the Canada Mortgage and Housing Corporation and the Institute for Research in Construction to assess the performance of the displacement ventilation system installed in this prototype house. This report presents the results of this evaluation.

The results will help to develop guidelines for designing and constructing suitable and affordable housing for environmentally hypersensitive individuals. Some of the measures used in this prototype house may also be adopted in new and existing houses to improve indoor air quality.

*Prepared by J.S. Zhang, R.J. Magee and C.Y. Shaw of the National Research Council of Canada. Ottawa: Canada Mortgage and Housing Corporation, 2001. 26 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

**\*\* SEE ALSO:** *Cost Effective Indoor Air Quality and Energy Efficiency Recommendations for First Nations Housing*, p. 15

### FEASIBILITY OF UTILIZING A PORTABLE HOUSING PLANT FOR SINGLE FAMILY DETACHED CONSTRUCTION

This project would study the economic feasibility of using an automated, highly mobile plant to produce houses that are from 90-95% complete when they leave the plant. The plant would be erected in the subdivision where the houses are to be built, and once the construction program is complete, the plant would be dismantled and shipped to the next locale.

**CMHC Project Officer :** Chris Ives

**CIDN :** 2305 0200004

**Division :** External Research Program

**STATUS :** Planned

**AVAILABILITY :** Publication is not available

### LAND USE ISSUES IMPEDING THE PROVISION OF AFFORDABLE HOUSING WITH MOBILE HOMES

The study will summarize the manufactured (mobile) home legislative environment across the U.S. and Canada, identify legislative and land use impediments blocking improved market share on the part of the Canadian industry, analyze the relevance of the pro-active U.S legislative environment as a paradigm for Canadian legislative reform and develop suggestions for manufactured home land use and legislative development in Canada.

**CMHC Project Officer :** Doug Pollard

**CIDN :** 2154 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### MANUFACTURED HOUSING CONSULTANTS' TRAINING PROGRAM - PHASE II

This is a partnership project between the Canadian Manufactured Housing Institute (CMHI), the Provincial Manufactured Housing Associations of B.C., Alberta and Saskatchewan, Ontario and Atlantic Canada, and CMHC. The purpose of this project is to build on and improve the two day Manufactured Housing Consultants' Training Program and to ready it for ongoing delivery at the provincial level. The participant's manual and the trainer's material will be revised to incorporate improvements resulting from the pilot program, and new additional material will be developed such as: section for modular retailers, participants workbook, and marketing and promotional materials. These changes are necessary to ensure a high level of quality, effectiveness and consistency of the course delivery by the various provincial industry associations. This work is anticipated to be completed by Spring of 2001. Once this work is completed, the program will be delivered through a partnership arrangement with provincial associations/organizations and it will be open to all representatives of the manufactured housing industry in Canada.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2196 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### **MANUFACTURED HOUSING: UPDATING AND REWRITING LOCAL REGULATIONS: REGIONAL DISTRICT OF NORTH OKANAGAN = L'HABITATION USINÉE : MISE À JOUR ET RÉÉCRITURE DES RÈGLEMENTS LOCAUX : DISTRICT RÉGIONAL DE NORTH OKANAGAN**

The purpose of this project, sponsored by B.C.'s Regional District of North Okanagan (RDNO), was to end discrimination against manufactured housing and encourage its parity with site-built homes. In the RDNO, officials recognized the need for more affordable housing within the jurisdiction and wanted to promote and encourage alternative housing forms. They realized their out of date regulations governing manufactured housing were part of the problem. This project examined the regulatory environment for manufactured housing in the Regional District of North Okanagan, in south central British Columbia. As a result, the RDNO and one of its incorporated townships adopted regulations making it easier for this type of housing to flourish. It proposed solutions, that if adopted Canada-wide would put manufactured housing on an equal regulatory footing with sit-built homes. The adopted RDNO Manufactured Home Community Bylaw is included as an appendix in this ACT case study.

*Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2000. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study)*

Order Number: 61425

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## MOISTURE AND MOLD

### **GUIDELINES FOR MOISTURE MANAGEMENT IN EXTERIOR WALL SYSTEMS**

CMHC is providing financial and technical support to NRC/IRC to develop guidelines for moisture management strategies for exterior wall systems. The guidelines will address user requirements for long-term performance and durability of wall systems for the wide range of climate zones across North America.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2199 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### **GUIDELINES FOR THE MEASUREMENT OF MOISTURE CONTENT IN FRAMED LUMBER**

The objective of this project is to develop a guideline or protocol for the proper use of moisture measurement tools in measuring the moisture content of a specific point in a framed lumber assembly. The document will outline a process of how to take moisture readings, where to take moisture readings and how the moisture readings are corrected for temperature and wood species. In addition, the document will provide a general discussion about assessing the overall moisture content of the wood framed assembly.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2398 0200001

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available



### IMPROVEMENTS TO THE MOISTURE PERFORMANCE OF PRESERVED WOOD FOUNDATIONS

Work by Forintek, the wood industry research agency, has established that the bottom plate of preserved wood foundation walls is very often over 20% moisture content. The wood preservatives generally prevent this relatively high moisture content from causing any degradation in structural strength. However, it is possible that the wet plate will transfer moisture to the insulated cavity above. This may lead to the development of mold in the wall cavity. The objective of this research project is to retrofit a mold troubled Ottawa area preserved wood foundation to validate a practice for reducing a high moisture level and mold within the PWF cavity. The demonstration house has been modified by using fans to ventilate the lower part of the wall cavities. Monitoring of wood moisture levels will continue through 2001.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2419 0200

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

### MOLD CLEANUP PROCEDURES: CONTRACTORS' GUIDE

A draft document for professionals on Mold Cleanup Procedures is under development by CMHC. The focus of the document is on information required by contractors involved in renovation and clean-up of mold contaminated houses. As a result of rapidly evolving knowledge in this field, the current draft of the document and its mold cleanup procedures are now being revised to incorporate more current and substantive information from authoritative sources. This document will address mold cleanup in general and will include information on the precautionary measures required to protect workers and occupants, and present best practices for mold remediation. A significant change in approach since preparation of the original draft is the expert consensus that mold remediation should be approached from the perspective of the size of visible mold area rather than the type or toxicity of the molds present.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 2380 0200

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### MOLD IN HOUSING: AN INFORMATION KIT FOR FIRST NATIONS COMMUNITIES

The information in this kit will assist First Nations communities to recognize when there is a mold problem and to take the necessary steps to deal with the problem. This kit is intended for:

- technical service providers (inspectors) ;
- First Nations housing departments -- housing coordinators and maintenance staff;
- bands -- band managers, housing providers;
- health providers -- community health nurses/representatives and environmental health officers;
- occupants; and
- trades -- builders, contractors and renovators.

Mold is a widespread and common problem in houses anywhere, both in and outside First Nations communities. It can be a minor nuisance or it can have major effects on the occupants.

Mold in houses does not happen overnight. The solutions are also not immediate. A strategy needs to be adopted that includes responding to existing situations, preventing future problems and planning new construction. The responsibilities of the key players and their training needs are identified in this kit.

## MOISTURE AND MOLD

The first part of this kit (chapters 1 to 5) is basic information. It is written for occupants. The second part (chapters 6 and 7) clarifies the responsibilities of the key players and identifies the training they need. The third part (chapters 8 to 17) deals with specialized topics and is directed to housing providers.

*Ottawa: A joint publication of Canada Mortgage and Housing Corporation, Health Canada, and Indian and Northern Affairs Canada, Assembly of First Nations Housing Secretariat, 2001. 91 pages*

Note: Publié aussi en français sous le titre : La moisissure dans les logements : Trousse d'information pour les collectivités des Premières nations

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

**\*\* SEE ALSO:** *BC Moisture Problems*, p. 31

## NORTHERN HOUSING

### COMPARISON OF NORTHERN HOUSING COSTS

This project will outline all components associated with the production of a Northern home - from soft to hard, at both the house level and community level to determine which elements, in which locations are inordinately skewing costs. Use of direct data from Northern communities will verify these costs. Index communities will allow for comparison of costs between Northern communities, and between the North and South. The operationalized database will permit future tracking and analysis such as life cycle performance costs; where use of local labour, indigenous materials and value-added processing of raw, local materials can be developed or expanded to reduce housing costs; and where capacity building may be of benefit. The database will be available in Summer of 2001.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2370 0200

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### INNOVATIVE FOUNDATIONS, HEATING & VENTILATION

This R&D&C (research, development, commercialization) project and first stage monitoring is complete. CMHC, Yukon Housing Corporation (YHC) and Yukon Energy partnered in building two research/demonstration houses in Dawson City, Yukon. This work is a continuation of previous successes in R&D&C of the space frame foundation technology now being exported to Alaska. The thrust of the current foundation work is to reduce cost, develop a technology that can be locally manufactured and reduce the height of the crawl space.

A torque tube HSS steel section is under one house. The other house will be an extension of the sheet metal reinforced plywood monocoque technology resting on three bearing points. Lots of ground movement has been reported so the test site is proving to be a good demonstration. After a review of northern and remote technology, the heating and ventilation systems incorporate and optimize energy efficiency, minimal equipment and sustainable ventilation operation. Construction is complete and the houses are occupied. Commissioning of the project was a large task and the systems appear to be running efficiently at about half the energy consumption of a typical northern house. The mechanical technology was used on another YHC project at substantial capital savings and with some modifications appears to be the technology of choice. Work is underway to develop a more cost effective and simple foundation system.

**STATUS :** Completed

**AVAILABILITY :** Publication is not yet available

## NORTH WEB-SITE

The purpose of this partnership project was to design, establish and maintain a dedicated NoRTH Web-Site for a two year period. The project partners are CMHC, Alaska Housing and Finance Corporation, NWT Housing Corporation, University of Alaska (Fairbanks), and Yukon College. The web-site includes relevant technical information such as factsheets of research reports and the Frostline newsletter. It also includes discussion groups to provide a means of ongoing and current communication. The web-site has links to other relevant web-sites and can be visited at [www.NoRTH-RTHN.org](http://www.NoRTH-RTHN.org). A current site renovation by NWT Housing Corporation will enable it to become self-supporting. This project will retain a person to post the backlog of articles, to recruit new material needed by Northern audiences, implement the planned next steps such as negotiating links to critical sites, creating a chat room format, etc.

**CMHC Project Officer :** Aleta Fowler

**Division :** Research Division

**AVAILABILITY :** No report will be published

**CIDN :** 2369 0200

**STATUS :** Ongoing Project

## NORTHERN HEALTHY HOUSE DEMONSTRATION

The North has proven itself receptive to Healthy House components as demonstrated by the success of the adoption of microsystems in numerous communities. The North is at a critical juncture with de-evolution of housing responsibility to the community level. Many communities are debating primary housing and infrastructure issues. This project identifies all Healthy House components, with each of their options, to allow communities to make choices based upon their specific circumstances. This feasibility report will be available in the Summer of 2001, and will be followed by a Demonstration Project to begin in 2001.

**CMHC Project Officer :** Aleta Fowler

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2471 0200

**STATUS :** Ongoing Project

## RESIDENTIAL FOUNDATION SYSTEMS FOR PERMAFROST REGIONS

Permafrost underlies all of the Yukon, Northwest and Nunavut Territories and much of the northern portions of the provinces, especially Manitoba and Quebec. Frozen ground conditions can have significant adverse effects on structures in the north. The effects of settlement and frost heaving commonly result in the premature deterioration of residential structures. Problems related to foundation design and construction can be reduced to a minimum if care is taken in the selection of suitable sites and appropriate foundation systems.

This project is a study on foundation systems for use in Northern permafrost and intermittent permafrost areas. The study assembled, documented and analyzed all data possible from literature searches and from the field on all known foundation systems used in the north. The final report includes a decision making tree to enable communities, homeowners, builders and renovators to make informed and appropriate choices in foundation systems.

Prepared by AGRA Earth & Environmental Limited. CMHC Project Officer: Aleta Fowler.  
Ottawa: Canada Mortgage and Housing Corporation, 2000.

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



### USE OF COMPRESSED-AIR-FOAM TECHNOLOGY FOR FIRE PROTECTION OF HOUSING IN THE NORTH

The high cost of Northern housing, and housing insurance, may justify the installation of fixed automatic fire suppression systems. Conventional sprinkler systems require more water than is presently available in buildings and would entail substantial re-design. Further, although sprinkler systems may allow some occupants of the building time to exit, and may allow time for fire fighters and equipment to arrive, water damage in suppressing the fire usually damages the building beyond reasonable repair. The National Research Council of Canada (NRC) has developed a compressed-air-foam (CAF) system which uses 10% of the water required by conventional sprinkler systems. Further, it is designed to extinguish, not just contain or suppress, fires. This study is a partnership project headed by the Fire Marshal of the Northwest Territories. Partners include the GNWT Public Works and Government Services, Justice, Health, Municipal and Community Affairs, Corrections Canada, NWT Housing Corporation and others. It will look at the preliminary feasibility of the design of a self-contained CAF system for a building (optimal CAF piping and discharge), assessment of the water requirements for the CAF system, and the development of appropriate CAF nozzles.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2311 0200002

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

**\*\* SEE ALSO:** *Alternative Home Energy Sources for the North*, p. 23

*Northern Heating and Ventilation Systems*, p. 29

## PROPERTY MANAGEMENT

### CONTRACT MANAGEMENT COURSE FOR RESIDENTIAL PROPERTY MANAGERS AND BUILDING OWNERS

This project will develop course content to provide an introduction to construction/contract management processes for residential property managers, building owners and anyone involved in the administration of multi-unit residential buildings. The course material will be as applicable to the management of major service contracts as it is to major construction works including repair, replacement and/or rehabilitation projects. Topics covered in this course include the different types of construction or service contracts, a discussion of the construction process, administering the tendering process, evaluating the tendered bids, contractor /consultant selection, bonding and insurance requirements, the building owners responsibilities and those of the contractor/consultant. This project should be completed by late in 2001.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2294 0200

**Division :** Research Division

**STATUS :** Planned

**AVAILABILITY :** Publication is not available

### TECHNICAL AUDIT COURSE FOR PROPERTY MANAGERS

This project aims to develop a course for property managers on the technical audit of high-rise residential buildings. Using a building as a system approach, this course will provide property managers and building owners with a perspective of the interaction of all building systems and components. Such training is not available to residential property managers in Canada. Technical audits, an organized review of building systems, are an effective way to assess the condition of a building, to understand how the building is performing and to provide a sound basis for making maintenance, repair and upgrade decisions. The course provides the property manager with insights into the technical audit process and highlights the requirements for undertaking technical

## PROPERTY MANAGEMENT

audits of residential buildings including the scope of the work, the consultant qualifications. The course also introduces the fundamental principles of building science to encourage holistic solutions to building problems.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2297 0200

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## REGULATORY REFORM

### AUSTRALIAN BUILDING REGULATION AND LIABILITY REFORMS: AN UPDATE

This report builds on, and complements, the 1999 report "Australian Building Regulation and Liability Reforms". It examines the experience of home builders with the new building regulatory system, reviews the regulatory regime being established in the state of Tasmania, and assesses how the information gathered might affect the adoption of similar reforms in Canada.

*Prepared by Greg Lampert. Prepared for Canadian Home Builders' Association and Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2000. (Healthy Housing and Communities Series) 53 pages*

Order number: 62158

**NOTE :** Aussi disponible en français sous le titre : Réformes de la réglementation australienne de la construction et des dispositions en matière de responsabilité: Le Point

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

**\*\* SEE ALSO:** p. 94-99

## RENOVATION AND INSPECTION

### CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS - STEERING COMMITTEE FOR NATIONAL OCCUPATIONAL STANDARDS

The purpose of the first phase of this multiphase project is to develop national occupational standards for the private home inspection and municipal building code inspection sectors. The project was supported by the industry sectors, Human Resources Development Canada and CMHC. A committee consisting of seven members from each of the two sectors plus an independent chair was formed and operated under the name of Canadian Home Inspectors and Building Officials - Steering Committee for National Occupational Standards. There were a total of three focus group workshops consisting of industry members from across the country to develop the draft standards. The standards were later sent out to industry stakeholders, and posted on industry web sites for validation by the membership at large. Two separate national occupational standards were approved, one for each of the sectors as well as a third document which combines the core competencies common to the two sectors. The final documents are being translated and are anticipated to be completed for distribution in late Spring 2001.

The Canadian Home Inspectors and Building Code Officials are now preparing for the next phase which is to use the occupational standards and complete the remaining steps of the project, such as curriculum development, validation of training material and training facilities, development of exam, development of standards of performance, criteria for certification of inspectors, criteria for accreditation agencies, code of ethics, etc. CMHC continues to support this industry initiative.



## RENOVATION AND INSPECTION

**CMHC Project Officer :** Darrel Smith

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1962 0200002

**STATUS :** Ongoing Project

### **FEASIBILITY STUDY FOR A HERITAGE RENOVATION ASSISTANCE SERVICE, LAC-SAINT-JEAN HISTORICAL SOCIETY, ALMA, QUEBEC = ÉTUDE DE FAISABILITÉ SUR UN SERVICE D'AIDE À LA RÉNOVATION PATRIMONIALE, SOCIÉTÉ D'HISTOIRE DU LAC-SAINT-JEAN, ALMA (QUÉBEC)**

This case study documents the work of the Lac-Saint-Jean Historical Society which received an A.C.T. grant to study the feasibility of establishing a "Heritage Renovation Assistance Service". This Service is targeted at those involved in the renovation process and provides both do-it-yourself and professional home renovators with a comprehensive and easy-to-understand source of information on acceptable renovation techniques and materials. The case study report describes the project's aims and results, and the community and key players involved. The benefits resulting from the Service are described as well as how this type of service would be useful to renovators in other municipalities.

Case study written by: Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 38 pages

Order Number: 61994

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

### **FEASIBILITY STUDY ON USING THE PRIVATE HOME INSPECTION INDUSTRY TO COLLECT DATA ON THE PHYSICAL CONDITION OF CANADA'S EXISTING HOUSING STOCK**

The purpose of this project was to conduct a feasibility study on the use of the private home inspection industry nationally as a vehicle for gathering data on housing characteristics and physical conditions. The study investigated the type of information desired by CMHC and the type of information currently being gathered by the inspection industry. The study considered the various reporting systems being used, the numbers and types of homes inspected annually, geographic coverage, reliability of the information, anticipated costs, confidentiality requirements, use limitations and potential contractual arrangements for obtaining this and other data for CMHC's purposes. The final report for this study is complete, however before considering the recommendations the study is to be amended to include an investigation of similar interests by other groups and departments, internal and external to CMHC and to consider the possibility of undertaking a coordinated data collection project. The second part of this project will occur in 2001 and is anticipated to be completed by the Fall.

**CMHC Project Officer :** Darrel Smith

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2286 0200

**STATUS :** New Project



## GUIDE FOR THE HEALTHY RENOVATION OF A ONE STOREY HOUSE CIRCA. 1960-1979

The objective of this project is to provide consumer information on typical approaches to the repair and renovation of bungalow-style houses built between 1960-1979. The advice considers occupant lifestyle and needs, structural and maintenance requirements, "Healthy Housing" improvements (including environmental and energy-efficiency), and the impact on home equity and resale value. The publication will include case studies of common renovations to this style of house. The guide will resemble the initial publication in this series which describes appropriate renovations to 1½ storey houses. The report is being prepared for publication.

**CMHC Project Officer :** Don Fugler

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2202 0200001

**STATUS :** Ongoing Project

## NATIONAL RENOVATORS' TRAINING PROGRAM - REVISION 2000

The purpose of this project is to revise and amend the course content and format of CMHC's National Renovators' Training Program. As discussed with the Canadian Renovators' Council, this work will implement the short-term and long-term improvement recommendations presented in the CMHC report Renovator Training in Canada: Current Situation and Future Strategies. One significant revision will allow for the course to be presented effectively in two phases, with five three hour modules in each phase. The revision is underway and should be completed by Summer of 2001.

**CMHC Project Officer :** Darrel Smith

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2387 0200

**STATUS :** New Project

## PRIORITIZED PRACTICAL APPROACHES FOR ESSENTIAL REMEDIATION, REPAIR AND MAINTENANCE PROJECTS

The purpose of this project was to identify and prioritize essential remediation work which must be completed before undertaking common renovation projects. Information has been produced in twelve independent fact sheets on how to identify the prioritized work, consequences of not doing the work, practical solutions, and benefits. This information will be useful to homeowners to help them prioritize essential repair work either in isolation or as part of a renovation project. The information can also be used by renovators as a tool to help convince homeowners of other essential repairs which needs to be corrected as part of a renovation project when applicable. These twelve "Before You Renovate" fact sheets include the following titles:

- Assessing the Renovation Project. About Your House Series; CE 28a
- Before You Start Renovating Your Basement - Structural Issues and Soil Conditions. About Your House Series; CE 28b
- Before You Start Renovating Your Basement - Moisture Problems. About Your House Series; CE 28c
- Before You Start Renovating Your Kitchen. About Your House Series; CE 28d
- Before You Start Renovating Your Bathroom. About Your House Series; CE 28e
- Before You Start Window and Door Renovations. About Your House Series; CE 28f
- Before You Start Repairing or Replacing Roof Finishes. About Your House Series; CE 28g
- Before You Start Repairing and Replacing Materials -- Exterior Walls. About Your House Series; CE 28h

## RENOVATION AND INSPECTION

- Before You Start an Energy Efficient Retrofit -- Mechanical Systems. About Your House Series; CE 28i
- Before You Start an Energy Efficient Retrofit -- The Building Envelope. About Your House Series; CE 28j
- Before You Start Assessing the Comfort and Safety of Your Home's Mechanical Systems. About Your House Series; CE 28k
- Before You Start a New Addition. About Your House Series; CE 28L

Ottawa: Canada Mortgage and Housing Corporation, 2001.

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products and available on the Internet at:  
<http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/index.cfm>

## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

### ACTION PLAN FOR REDUCING GREENHOUSE GASES IN RURAL COMMUNITIES

By communicating the experience of Perth, Ontario, the purpose of this project is to prepare an integrated planning strategy that would provide guidance for rural municipalities across Canada facing the challenges of developing action plans for achieving Kyoto targets for reducing greenhouse gas (GHG) emissions. The objective is to provide an innovative, comprehensive planning approach for rural communities that integrates transportation planning, land use planning, new housing and retrofits, waste management, economic development and the regulatory environment.

**CMHC Project Officer :** Susan Fisher

**CIDN :** 2105 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### CANADIAN HOMES AND CLIMATE CHANGE

The object of this research is to create a guide for consumers on Canadian homes and climate change. The guide, in the form of a questionnaire, will help consumers identify where they can make changes in their activities and households to minimize their greenhouse gas creation. CMHC will contribute the Guide as part of the broadly based, national social marketing initiative to reduce climate change. A draft questionnaire has been prepared and published in various publications. The questionnaire has been redrafted for easier use. This new form is being tested prior to publication.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2120 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### CONSTRUCTION RESOURCE MANAGEMENT COURSE - PHASE II

A private and public sector consortium was established to develop a methodology for assisting industry to better understand, control and reduce the levels of construction, renovation and demolition (CRD) waste. The partners included; Department of National Defense, Industry Canada, Canada Mortgage and Housing Corporation, Alberta Environmental Protection, NWT Department of Resources, and PCL Constructors Canada Inc. Phase I was the development of a CRD training course in hard copy. The course provides practical and comprehensive information



on resource management issues in the Canadian CRD industry. It is intended for project managers which include, but are not limited to: engineers, architects and CRD contractors. Phase II consisted of the development of an Internet based CRD project management course that would: provide current resource management information and case-specific solutions; contribute to the development of standard managerial practice; promote widespread communication of the best resource recovery techniques, contribute to economic growth and job creation; promote long-term behavioural change; and help industry associations and government departments meet mandated environmental targets.

**STATUS :** Completed

**AVAILABILITY :** To obtain more information on the CRD Course please contact Vince Catalli at byDesign Consultants (613) 759-4605 or at [www.bydesignconsultants.com](http://www.bydesignconsultants.com).

### DEVELOP A SET OF ENVIRONMENTALLY SUSTAINABLE SITE AND BUILDING DESIGN, CONSTRUCTION AND OPERATION GUIDELINES FOR SINGLE AND MULTI-FAMILY UNIT HOUSING, MOTELS AND HOTELS FOR THE TOWN OF BANFF

The purpose of this project is to develop a set of environmentally sustainable site and building design, construction and operation guidelines for single and multi-family unit housing, motels and hotels for the Town of Banff in a manner which could be used to inform the development of similar guidelines for other communities across Canada.

**CMHC Project Officer :** Doug Pollard

**CIDN :** 2309 0200001

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

### IMPLEMENTING SUSTAINABLE COMMUNITY DEVELOPMENT: CHARTING A FEDERAL ROLE FOR THE 21ST CENTURY

This research was undertaken to accelerate the implementation of sustainable communities in Canada and was designed to answer the following key questions:

- What are the essential features of sustainable community development?
- Why is sustainable community development so important to the future economic, social and environmental health and well being of Canadians?
- What is the current status of sustainable community development in the US, Europe, Australia, New Zealand and Canada, and more importantly, what are federal governments doing to support these innovative developments?
- What are the primary barriers to sustainable community development in Canada?
- What types of policy and program measures could the federal government implement in partnership with municipal governments and others to effectively stimulate the implementation of sustainable communities in Canada?

This report is written primarily for federal policy makers who are interested in promoting sustainable development and reducing greenhouse gases at the community level. However, it also provides resources for other practitioners - innovative developers, development consultants, planners and municipal, regional and provincial policy makers - who are also interested in implementing sustainable communities.

Information on "good practices", examples of the major features of sustainable communities and possible questions for assessing development proposals are provided. Five detailed case studies on successful and unsuccessful sustainable communities and included lessons learned with practical



advice on marketing and financing are provided. Pictures and graphics illustrating the major features of sustainable communities are used throughout the report.

*Prepared by P & A Peck & Associates. Written by Steven Peck, Ray Tomalty, Anna Hercz and Guy Dauncey. Prepared for Canada Mortgage and Housing Corporation and Natural Resources Canada. CMHC Project Officer: Doug Pollard. Ottawa: Canada Mortgage and Housing Corporation, 2000.*

**STATUS :** Completed

**AVAILABILITY :** Canadian Housing Information Centre

## LIVING BY WATER GUIDEBOOK

The objective of this project is to prepare, publish, market and distribute a guidebook for waterfront residents on reducing environmental impacts of housing on aquatic and shoreline habitat.

**CMHC Project Officer :** Susan Fisher

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2040 0200001

**STATUS :** Ongoing Project

## PRACTICES FOR SUSTAINABLE COMMUNITIES

"Practices for Sustainable Communities" presents:

- A framework to identify and organize the practices --- the tools, strategies and activities -- that lead to greater sustainability; and
- Examples of sustainable community development practices.

This book makes the idea of sustainable development a practical reality. It is a Canadian view of the challenges of sustainability, with made in Canada case studies and solutions.

Included with the publication is SCIP, the Sustainable Community Indicators Program, developed by CMHC and Environment Canada. SCIP helps communities measure their progress in building and living sustainably. Communities can create a locale vision of sustainability and measure and monitor their progress in making that vision a reality.

Ottawa: Canada Mortgage and Housing Corporation, 2000. 176 pages

Order number: 62160 \*\*Price: \$59.95 + GST and handling charges.

NOTE : Aussi disponible en français sous le titre : Pratiques pour des collectivités durables

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## RESIDENTIAL GREENWAYS IN TRANSITION: FOUR DECADES OF PRACTICE IN WATERLOO

This research examines the evolution and assesses the merits of residential greenways employed in the City of Waterloo over the past four decades.

**CMHC Project Officer :** Susan Fisher

**Division :** External Research Program

**Grant Recipient :** Larry Martin

**AVAILABILITY :** Publication is not available

**CIDN :** 2144 0200015

**STATUS :** Ongoing Project

### SOIL AND FLORA RESTORATION AFTER GROUND DISTURBANCE

This research will examine local soils and indigenous plants in the North to arrive at a means for restoring healthy ground cover after disturbance (such as construction), at the least cost. In the North especially, ground cover loss exacerbates erosion of buildings, roadways and community infrastructure. Soil damage due to exposure leads to summer dust which deteriorates building exteriors and heating systems; impedes the operation of windows and doors; and affects the health of both the occupants and the community at large. Ground cover damage is also one of the leading factors for the break-down of permafrost. This study has the possibility for developing entrepreneurial opportunities and will be of interest to communities, health care providers, northern housing providers as well as to other northern countries. The final report will be available in 2002.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2311 0200002

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

**\*\* SEE ALSO:** *Information Transfer of Healthy Housing Technology in the Aboriginal Context*, p. 15  
*Northern Healthy House Demonstration*, p. 57

## WATER CONSERVATION, REUSE & MANAGEMENT

### CASE STUDIES OF WATER CONSERVATION INITIATIVES IN MULTIS

CMHC, in partnership with City of Toronto Better Buildings Partnership, will document case studies of water conservation retrofits for multi unit residential buildings. The building profile, water conservation measures, costs and resulting water and energy savings will be described. The studies will serve as examples to encourage water use efficiency in other building and will appear on CMHC's website.

**CMHC Project Officer :** Cate Soroczan

**CIDN :** 2239 0200

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### DUAL FLUSH TOILET PILOT PROJECT

CMHC is working with a number of municipalities across the country to conduct a pilot program for dual flush toilet systems in a variety of buildings. This study will monitor water consumption and toilet performance as well as customer satisfaction with the dual flush system. Twelve agencies from eight provinces are participating in the project which will see toilets installed in single family homes, multi unit residential buildings, municipal and commercial buildings. These dual flush toilets will be compared to typical 13L and 20L toilets as well as Ultra Low Flow 6L toilets on a consumption and cost basis. Anticipated results of this work will be the increased awareness of dual flush systems across the country, and an improved ability to overcome regulatory, technical, and perceptual obstacles.

**CMHC Project Officer :** Cate Soroczan

**CIDN :** 2336 0200

**Division :** Research Division

**STATUS :** New Project

## ECONOMIC FEASIBILITY STUDY OF WATER REUSE AND TREATMENT TECHNOLOGIES

The purpose of this project is to undertake and complete an economic feasibility study of water reuse and treatment technologies. The contractor will assess ten case studies of on-site water reuse applications. Final draft has been received and the case studies will be uploaded to the CMHC water website on a monthly basis. Further attention is being paid to the financial aspects of water reuse and full costing.

**CMHC Project Officer :** Cate Soroczan

**CIDN :** 2089 0200002

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## IDENTIFY EXISTING AND EMERGING GREYWATER TREATMENT AND RE-USE TECHNOLOGIES AND TO EXPAND AND REVISE ITS TECHSPEX SOFTWARE TO INCLUDE GREYWATER OPTIONS

This project's objective was to undertake and complete a review of the emerging greywater treatment and re-use technologies and the expansion and review of the TechSpex software to include greywater options.

**CMHC Project Officer :** Cate Soroczan

**CIDN :** 1927 0200005

**Division :** Research Division

**STATUS :** Completed

## MAXIMUM DAY WATERING DEMAND PHASE II - ASSESSMENT OF WATER CONSERVATION STRATEGIES

To determine the impact of the Household Guide to Water Efficiency on indoor and outdoor water consumption. Specifically it will seek to address the questions: Is the impact on consumer behaviour maintained in the long term, what effect does the Guide have on outdoor water use during the summer months, and what extra impact does a complementary social marketing campaign have on consumer behaviour. This work is part of the second phase of the Max Day project initiated in 2000, which saw a reduction in consumption rates based on conservation method used.

**CMHC Project Officer :** Cate Soroczan

**CIDN :** 2341 0200003

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## ON-SITE WATER QUALITY MONITORING AND CONTROL SYSTEMS

The objective of this project is to identify, through consultation, the requirements and elements of a long-term monitoring and control system for on-site water reuse technologies which will meet health and environmental regulatory needs, etc.

**CMHC Project Officer :** Cate Soroczan

**CIDN :** 1936 0200001

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available



## PERFORMANCE ASSESSMENT OF BOOSTER PUMP CONTROLS FOR WATER AND ENERGY CONSERVATION

This pilot study, in partnership with Metro Toronto, Minto, and CMHC will assess the performance of two different booster pump control systems in 6 multi-unit residential buildings. Booster pump performance shall be measured in terms of electrical energy and water savings. The study will assess the impact of booster pump savings on buildings retrofitted with water efficient fixtures to ensure that only the technology application is measured without the influence of other concurrent changes. By utilizing 6 buildings with different characteristics, (size, # units, occupancy type), the work will also attempt to define what type of building profile will most benefit from utilizing this control system. The draft final report has been received and its findings indicate that greatest impact is felt with respect to energy savings. Water savings are best achieved through a leak detection and appliance retrofit program.

**CMHC Project Officer :** Cate Soroczan

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2267 0200001

**STATUS :** Ongoing Project

## PERFORMANCE ASSESSMENT OF LOW FLOW TOILETS

This project's objective is to set up and conduct a monitoring program to verify the flush volumes of Ultra Low Flow (ULF) toilets installed in single-family homes as part of Durham's retrofit program. Initial results indicate that depending on the brand of toilet installed there is a mixed reaction to low flow technology.

**CMHC Project Officer :** Cate Soroczan

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2416 0200001

**STATUS :** New Project

## WATER QUALITY MONITORING OF THE TORONTO HEALTHY HOUSE

The purpose of this project is to undertake the collection of water samples along various points from the Toronto Healthy House Water Reuse System and have them analyzed for a number of water quality parameters. To date a consultant has been awarded the contract and monitoring is underway.

**CMHC Project Officer :** Cate Soroczan

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2337 0200002

**STATUS :** New Project



## SOCIO ECONOMIC RESEARCH



### ALTERNATE ABORIGINAL TRAINING DELIVERY OPTIONS

Experience over the past several years has shown the need to explore alternate approaches to delivery of training to First Nations (FN) communities and other Aboriginal groups. It is proposed that a small study be launched to look at the feasibility of FN and other Aboriginal groups sharing training expertise and resources by a number of innovative techniques, to supplement the more conventional approach.

One possible model is having a FN community which has already received training or built up expertise on its own, provide a "trainer" to another community to demonstrate and teach the relevant members of the second community. A variation on this would be to have the second community send 1-2 of its members to "shadow" the expert for several days or more to fully learn how to implement a given approach, technology, etc.

The study would examine the various possibilities of training sharing, how logistics could work, what sort of recompense the trainer or "training community" should expect, etc. Such a study holds the promise of extending training delivery resources having effective "hands on" training and supporting capacity development.

**CMHC Project Officer :** *Marcelle Gareau*

**CIDN :** 01PL0-8426

**Division :** Research Division

**STATUS :** Planned

**AVAILABILITY :** Publication is not available

### COMMUNICATIONS & INFORMATION TRANSFER STRATEGY FOR ABORIGINAL GROUPS

The goal of this project is to develop a communications and information transfer strategy that will help CMHC in its interactions with Aboriginal housing groups regarding capacity development, research and information transfer activities. To be effective, information has to reach the audience that matters and be in formats that have the maximum impact.

The study looks at the barriers to finding and using housing related information, what makes housing related information relevant, what are key influences, and how effective are the available communications vehicles and distribution channels, all in regard to Aboriginal audiences.

The project consists of: an assessment of existing communication strategies and marketing research in the area of housing information and training; personal or telephone interviews with senior officials of key national and provincial stakeholder groups; group discussions with a broad range of the key client groups as defined in target audiences; and development of alternative communications and information transfer strategies for CMHC and assessment of their relative costs.

The target audience for this project is made up of: key decision makers in housing operations and policies, provincial organizations chosen to give regional coverage, major national organizations, and regional CMHC program officers.

The geographic coverage is Canada wide. All types of Aboriginal community, on or off-reserve in rural, remote and urban communities are included.

**CMHC Project Officer :** *Philip Deacon*

**CIDN :** 2225 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## EFFECTS OF URBAN ABORIGINAL RESIDENTIAL MOBILITY AND SERVICE PROVISION

This project will examine the effects of Aboriginal urban mobility upon service provision in areas such as housing, education, and health care in both the private and public sectors. The project is aimed at examining the effects of Aboriginal urban mobility upon the provisions of services to Aboriginal people in Winnipeg and Regina.

**CMHC Project Officer :** Marcelle Gareau

**CIDN :** 2436 0200

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## FIRST NATIONS HOUSING PROPERTY MANAGEMENT TRAINING COURSES AND RESOURCES

This project's objective is to undertake and complete the identification and assessment of First Nations housing property management training courses and resources and provide recommendations for a comprehensive curriculum and innovative approaches to delivery in remote communities.

**CMHC Project Officer :** Jim Rockwood (ABC)

**CIDN :** 2374 1500001

**Division :** Assisted Housing Division

**STATUS :** Planned

**AVAILABILITY :** Publication is not available

## PROPOSAL FOR RESEARCH AND CONSULTATION ON INUIT HOUSING

The objectives of this project are to develop a more current understanding of housing problems and priorities in Inuit communities, investigate and identify "best practices", and develop a housing strategy which will include innovative new means of financing and alternative forms of housing, recognizing that there is no funding for new housing commitments off-reserve through CMHC.

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## URBAN ABORIGINAL ACCESS TO HOUSING (AND HOMELESSNESS)

This research study will develop a survey instrument to measure the longitudinal profile of Aboriginal household mobility, access to housing and homelessness using a historical interview technique. Snapshot surveys tell us that Aboriginal households are significantly more mobile than non-Aboriginal. This hyper mobility includes not only movement between reserve or home community and urban areas, but also between urban areas and within urban areas. The hyper mobility may lead to frequent difficulties in accessing accommodation, especially when coupled with the low socio-economic status of many Aboriginal households and discriminatory practices of some landlords. Some literature suggest that this combination of circumstances could be a major factor leading to Aboriginal homelessness. About 45% of the Aboriginal population live in cities and this segment of the population is expected to grow by almost half by 2016, which will likely exacerbate the situation.

**CMHC Project Officer :** Philip Deacon

**CIDN :** 2160-020001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### HOUSING CANADA'S CHILDREN

This study looks at children and the families in which they are raised, in the context of their environments. It presents a number of facts about Canadian households with children that describe their make up, the types of housing in which they live and their tenure arrangements. It also draws attention to the probable links between housing environments and children's development outcomes.

Overall, the findings of this study suggest that most children in Canada are raised in good housing environments. Eighty-five per cent of households with children lived in dwellings that were affordable, were in good repair and had enough bedrooms for the number and mix of household members, or they could have afforded to rent dwellings meeting these standards. However, the other 15% of households with children were in core housing need and they experience problems of affordability, housing disrepair and/or over-crowding. Furthermore, lone-parent households, family households that rented their accommodation and households with children with disabilities or Aboriginal identity were particularly susceptible to living in core housing need.

In 1996, two-parent households spent on average 21% of their income on shelter costs. In contrast, lone-parent households spent 34% of their income for shelter, which is higher than the norm for affordability and fewer of them lived in single-family housing units than in 1976. Households that spend more than the norm for their shelter - in terms of dollar amounts and the proportion of their incomes - are left with less to spend on other areas including food, transportation, recreation, children's clothing, education and reading, and child care. These items in general support healthy child development.

The study also shows that housing disrepair and crowding bear a relationship to child development outcomes. The potential exists for detrimental long-term effects on children raised in crowded dwellings in disrepair. The findings suggest that these children are more at risk of poor health, asthma, poor school performance, aggressive behaviours and trouble with the law. For example, 89% of children in sufficient housing were in excellent health compared to only 72% of children in crowded housing in disrepair, an outcome that underlines the importance of good housing environments for healthy development.

*Prepared by Canadian Council on Social Development. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 2000. (Distinct Housing Needs Series) 34 pages*

Order number: 62209

NOTE : Aussi disponible en français sous le titre : Le logement des enfants au Canada

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## CITY PLANNING AND HUMAN SETTLEMENTS

### ASSESSING THE FULL COSTS OF WATER, LIQUID WASTE, ENERGY AND SOLID WASTE INFRASTRUCTURE IN THE FRASER VALLEY REGIONAL DISTRICT

This project was conducted for CMHC by The Sheltair Group Inc. in order to demonstrate the benefits of using full-cost accounting tools and techniques to evaluate the social, economic, and environmental costs and impacts of urban growth. Using the Fraser Valley Regional District (FVRD) in British Columbia as a case study, a two-part project was conducted. The project resulted in the development of a methodology and an associated software tool for compiling and analysing detailed infrastructure profiles, and then using these profiles to assess the full costs of different growth scenarios. The report is organised in two parts: Part I provides background



information about the FVRD, and presents a methodology specific to the Regional District. Part 2 describes the development of the software tool, and presents results of the application to the FVRD.

*Prepared by The Sheltair Group Inc. and the International Centre for Sustainable Cities (Sustainable Cities Foundation). Prepared for: Research Division, Canada Mortgage and Housing Corporation; Planning Department, Fraser Valley Regional District, Growth Strategies Office, Ministry of Municipal Affairs. CMHC Project Officer: Doug Pollard. Ottawa: Canada Mortgage and Housing Corporation, 2000.*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## **IMPLEMENTING THE OUTCOMES OF THE SECOND UNITED NATIONS CONFERENCE ON HUMAN SETTLEMENTS (HABITAT II): CANADA'S RESPONSE = MISE EN ŒUVRE DES MESURES ADOPTÉES LORS DE LA DEUXIÈME CONFÉRENCE DES NATIONS UNIES SUR LES ÉTABLISSEMENTS HUMAINS (HABITAT II) : RAPPORT DU CANADA**

The Second United Nations Conference on Human Settlements, Habitat II, was held in Istanbul, Turkey in June 1996. Habitat II brought together representatives from 171 countries to discuss an issue of global concern: shelter and human settlements in a rapidly urbanizing world. The countries participating in Habitat II adopted the "Habitat Agenda", a commitment by the world's nations to improve living conditions in the world's cities, towns, and villages.

In June 2001, five years after Habitat II, the General Assembly of the United Nations will hold a special session, popularly known as Istanbul + 5, to review and appraise implementation of the "Habitat Agenda" worldwide. In preparation for this session, countries have been invited to report on implementation of the Agenda. The United Nations Centre for Human Settlements (UNCHS) has developed reporting guidelines for use in the preparation of the national reports.

In response to the UNCHS invitation, Canada has prepared this Country Report, based upon a series of six Technical Reports. Part of this report focuses on qualitative and quantitative data addressing a series of identified indicators. These indicators are intended to measure progress relative to a number of commitments and recommendations in the Habitat Agenda. Canada's indicators data has been provided, where possible, for Canada as a whole and for each of five major urban areas: Vancouver, Calgary, Toronto, Montreal, and Halifax.

The main body of this report is divided into seven sections: an introductory overview, and six thematic chapters as requested by the UNCHS:

- Overview: The Canadian Approach
- Chapter 1: Shelter
- Chapter 2: Social Development and Eradication of Poverty
- Chapter 3: Environmental Management
- Chapter 4: Economic Development
- Chapter 5: Governance
- Chapter 6: International Cooperation.

Within each chapter, five subsections provide the following information:

- The first subsection addresses the identified indicators for the topic of the chapter.
- The second and third subsections provide an overview of key federal and provincial government initiatives relevant to the topic of the chapter. The information contained in these subsections was obtained via surveys of federal and provincial agencies.
- The fourth subsection summarizes selected municipal/local best practices relating to the topic of the chapter. The examples presented have all been independently evaluated as best practices through the mechanism of the UNCHS Best Practices Program and Database.
- The final subsection is a synthesis of stakeholder views on the topic of the chapter, derived from a series of interviews and reflecting a diversity of viewpoints on a number of key issues.

## CITY PLANNING AND HUMAN SETTLEMENTS

The Quebec Report was prepared by the Government of Quebec. It reviews the implementation of the Habitat Agenda in Quebec from the provincial perspective, and may be found in the Annex.

Canada Mortgage and Housing Corporation (CMHC) assumed overall responsibility for preparation of this report, with assistance from an Interdepartmental Steering Committee. Marbek Resource Consultants Ltd. undertook all research and writing, with contributions from Greg Lampert, Economic Consultant. Extensive assistance was provided by Statistics Canada and Environment Canada for the indicator data. Many other federal and provincial agencies provided information and input, as did a range of stakeholders. Provinces and territories that contributed to the development of the Country Report include Ontario, Quebec, New Brunswick, Manitoba, British Columbia, Prince Edward Island, Alberta, Saskatchewan, Newfoundland, and Nunavut. Ottawa: Canada Mortgage and Housing Corporation, 2001. ca 320 pages

Text in English and in French.

Order number: 62321

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products and  
[http://www.cmhc-schl.gc.ca/en/search\\_results.cfm](http://www.cmhc-schl.gc.ca/en/search_results.cfm)

## CONSUMER PROTECTION

### ISSUES PAPER ON LIABILITY IN HOUSE CONSTRUCTION

This project's objective is to produce a paper discussing the issue of liability in housing construction across Canada and identify who is and is not liable.

**CMHC Project Officer :** Mark Holzman

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1920 0200001

**STATUS :** Ongoing Project

## COOPERATIVE AND NON-PROFIT HOUSING

### CRISIS SITUATIONS IN COOPERATIVES: INCREASING UNDERSTANDING TO IMPROVE INTERVENTION

This research project concerns crisis situations in housing cooperatives: the conditions in which they emerge, but especially the dynamics put in place to resolve them.

**CMHC Project Officer :** Marie Murphy

**Division :** External Research Program

**Grant Recipient :** Andrée Richard

**CIDN :** 2018 0200001

**STATUS :** Ongoing Project

Confédération québécoise des coopératives d'habitation

155, boul. Charest est, bureau 100

Quebec, Quebec G1K 3G6

**AVAILABILITY :** Publication is not available



### **PUBLIC HOUSING TENANT SELF-MANAGEMENT: AN EVALUATION OF THE ALEXANDRA PARK CO-OP CONVERSION PROCESS IN TORONTO**

The purpose of this project is to produce an independent review and analysis of the conversion process that has taken place at Alexandra Park/Atkinson Co-op.

**CMHC Project Officer :** Vernon Barkwell

**CIDN :** 2305 0200020

**Division :** Research Division

**STATUS :** Planned

**AVAILABILITY :** Publication is not available

## HOME OWNERSHIP

### **HOMEOWNERSHIP EDUCATION AND COUNSELLING: AN EXAMINATION OF U.S. EXPERIENCE AND ITS RELEVANCE FOR CANADA**

The purpose of this research project was to examine the American experience with a view to identifying ways of enhancing affordable, sustainable access to homeownership in Canada. In carrying out the U.S. segment of this research, in addition to conducting a literature review, a survey of homeowner education and counseling (HEC) providers and participants was conducted together with follow-up interviews. For the Canadian portion of the research, a broad range of housing and community organizations (180 in total) were surveyed and follow-up interviews conducted in order to develop a portrait of existing homeownership access support services in Canada.

The first part of the report provides a comprehensive summary and evaluation of the HEC experience in the U.S. Following a synopsis of the historical evolution of HEC, the report outlines the characteristics of HEC programs, services and delivery agencies; responses from HEC industry participants surveyed; how HEC is funded as well as recent developments affecting the HEC industry; specifically the establishment of the American Homeowner Education and Counseling Institute (AHECI), the increased focus on standardizing program content and delivery as well as the certification of HEC providers. Next, the report describes the role that HEC has had in addressing credit, affordability, psychological, cultural and linguistic access barriers to homeownership and is followed with a summary of the statistical studies, research and anecdotal evidence assessing the efficacy of HEC both in facilitating access to homeownership as well as in mitigating mortgage loan default risk. This section of the report concludes by summarizing the results of the US HEC industry expert survey in such areas as: the future of HEC and its key factors of success; why industry leaders are so interested in HEC; and outlines respondents' comments on introducing HEC-type initiatives elsewhere.

The second part of the report examines the access support services and delivery structures existing in Canada to help households access homeownership. It examines information and/or access gaps which indicate the need for enhancing homeowner education and counseling efforts in Canada. The results of a national survey examining the nature, scope and operation of existing homebuyer education and counseling efforts in Canada are then presented followed by an assessment of the differences between what is offered in the U.S. vis-a-vis Canada in addressing access barriers to homeownership. The section of the report concludes by examining whether the gaps in services available in Canada might be filled by introducing HEC-style initiatives that draw on best practices used in the U.S. under the auspices of a housing sector-driven public-private partnership arrangement.

*Prepared by Hirshhorn Consulting Inc. and George McCarthy. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: David Metzak. Ottawa: CMHC, 2000 (Housing Affordability and Finance Series) (162 pages)*



## HOME OWNERSHIP

Order number: 62173

NOTE 1: Aussi disponible en français sous le titre : Services de formation et de consultation pour l'accèsion à la propriété : examen de l'expérience américaine et de sa pertinence pour le Canada (PF 0435)

NOTE 2: No. 68 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS** : New Completed Report

**AVAILABILITY** : CMHC Information Products

**\*\* SEE ALSO:** *Technical Aspects of Home Ownership*, p. 45

## HOMELESSNESS

### APPLICABILITY OF A CONTINUUM OF CARE MODEL TO ADDRESS HOMELESSNESS

This project will examine the applicability to Canada of a continuum of care (CoC) model by conducting in-depth case studies of the CoC model in four American communities. The project will analyze the benefits and limitations of each CoC program and review its applicability in addressing homelessness in Canadian urban centres.

**CMHC Project Officer** : Anna Lenk

**CIDN** : 2353 0200

**Division** : Research Division

**STATUS** : Ongoing Project

**AVAILABILITY** : Publication is not available

### CHILDREN AND YOUTH IN HOMELESS FAMILIES: SHELTER SPACES AND SERVICES

"Children and Youth in Homeless Families: Shelter Spaces and Services" provides a snapshot of how local communities across Canada meet the needs of homeless children and youth and their parents or guardians.

This research study involved a review of existing data and literature and two surveys of Canadian shelters. After the first screening survey, the second survey was administered to 112 shelters from large urban areas in most regions of the country.

While the findings may not be statistically representative of geographical regions or type of shelter, they highlight many interesting facts about the homeless children and youth who live in shelters with their families. For example, at the time of the study, over half of the children and youth were under the age of five, and problems with self-esteem and a sense of well-being were common. Not surprisingly, the families who used the shelters had no earned income and many relied on social assistance to meet their everyday needs.

The survey also examined the availability and adequacy of the shelters and their services. Overcrowding was a common problem, while the ability to provide facilities and services such as study areas, indoor and outdoor recreation areas, child care and counseling for children and youth depended on the type of shelter. More family violence shelters than general emergency or municipal shelters provided these facilities and services to their clientele.

The availability of services for parents such as job training, employment searches and on-site medical or legal services was also low in the general emergency shelters but higher in the family violence shelters and municipal programs.

The survey also asks where do homeless families go when they leave the shelters? The results indicate that most moved to their own apartment or house, while a much smaller number moved to another shelter, a rooming house or motel, or stayed with friends or moved to another city. Only a very small percentage lived on the streets.

Most of the families needed financial assistance and affordable housing to ensure a stable household for their children and youth. They also required counseling in life skills, child care and training and employment skills. Different shelters employed various strategies to meet these needs, ranging from home visits and follow-ups to help with budgeting and advocacy.

These are just a few of the insights obtained by this research study. But further research is recommended to provide a comprehensive inventory of the number, size and location of all the shelters serving homeless families with children and youth, and the types of services they provide. Also recommended for further study is an investigation of the health and long-term emotional effects that living in an emergency shelter has on children and youth.

Ottawa: Canada Mortgage and Housing Corporation, 2000. 117 pages

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### ENVIRONMENTAL SCAN: YOUTH HOMELESSNESS

The objective of the environmental scan is to provide:

- *an overview of the homeless youth population in Canada, including their shelter situation;*
- *an overview of the primary distinct housing and support issues relating to homeless youth;*
- *recent and upcoming Canadian initiatives, including publications, reports, conferences, projects, etc. on youth homelessness;*
- *names of agencies and key resource people working in the field; and*
- *types of effective housing interventions that have benefited homeless youth.*

**CMHC Project Officer :** Jim Zamprelli

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 01PL7-5639

**STATUS :** Ongoing Project

### GOVERNANCE IN LOCAL PARTNERSHIPS TO ADDRESS HOMELESSNESS

This research will identify tools and strategies for problem-solving and decision-making within complex partnerships. This will be done by examining methods and structures of collaboration at the local level among community-based agencies and municipal governments, working on homelessness issues, using case studies.

**CMHC Project Officer :** Anna Lenk

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2426 0200

**STATUS :** New Project

## HOMELESS INDIVIDUALS AND FAMILIES INFORMATION SYSTEM (HIFIS)

In order to help shelters and municipalities develop useful and comparable information on homeless people, in 1995 CMHC began a program of research to and develop the Homeless Individuals and Families Information System (HIFIS) as a user-friendly software application. HIFIS was designed by and for shelters throughout the country to meet their administrative operating requirements while at the same time collecting information that will provide quality data on homeless shelter clients. Municipalities will also benefit greatly from the use of HIFIS. By identifying the number and characteristics of homeless people served in shelters in their jurisdiction, many municipalities will, for the first time, gain a basic understanding of the homeless population in their region. As a result, local governments will be able to better plan, monitor and evaluate policies and programs designed to reduce the problem of homelessness.

In 2000, CMHC pilot tested the software in over 100 shelters in 8 of Canada's largest municipalities located all across Canada. After almost six years of research and development, CMHC has now passed the HIFIS system over to the National Secretariat on Homelessness to take it from being a pilot tested software to being an operational system with support available across Canada. HRDC intends that HIFIS assist local agencies throughout the country.

**CMHC Project Officer :** John Engeland  
**Division :** Research Division

**CIDN :** 2295 0200003  
**STATUS :** Completed

## HOUSING NEEDS OF LOW-INCOME PEOPLE LIVING IN RURAL AREAS

This project is intended to be a preliminary investigation of the housing needs of low-income people living in rural areas, including the existence of homelessness. The methodology includes a statistical profile, mainly from the Census, but supplemented by any surveys which have been done by the provinces/territories and by qualitative research to more finely identify issues affecting very low income or otherwise vulnerable households.

**CMHC Project Officer :** Anna Lenk  
**Division :** Research Division  
**AVAILABILITY :** Publication is not available

**CIDN :** 2367 0200  
**STATUS :** Planned

## HOUSING STABILITY AND MENTAL ILLNESS

The objective of this project is to evaluate the effectiveness of programs to promote housing stability for the mentally ill population at risk of homelessness. The research will look at a sample of programs and service providers in order to answer the question of which interventions and which factors most effectively help this population to access and, more importantly, maintain stable housing. Examples of housing-related interventions are supportive housing, residential care, support service agreements with private or social housing landlords, transitional housing, respite care, discharge planning, housing help and mediation services, and crisis response.

**CMHC Project Officer :** Anna Lenk  
**Division :** Research Division  
**AVAILABILITY :** Publication is not available

**CIDN :** 2290 0200  
**STATUS :** Ongoing Project



## HOMELESSNESS

### INVOLVING CLIENTS IN ADDRESSING HOMELESSNESS

This research project will explore and document methods that have successfully involved the homeless and formerly homeless population (including the various sub-populations of homeless people such as families, young people, women, Aboriginal people, persons with disabilities, people with mental illness and addictions, elderly people, refugees, and new immigrants) in:

- assessing their various housing-related needs;
- determining effective housing interventions;
- participating in the development of housing interventions;
- participating in the ongoing management and operation of housing projects; and
- project evaluation.

Project results will form the basis of a how-to guide on methods to involve homeless and formerly homeless people in determining and implementing housing solutions.

**CMHC Project Officer :** Jim Zamprelli

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2395 0200

**STATUS :** New Project

### STUDY OF TENANT EXITS FROM HOUSING FOR CHRONICALLY HOMELESS PEOPLE

This project's objective is to study the current residents and the recent evictees from a Toronto agency that has a long history of providing innovative housing and related services for the chronically homeless and 'hard to house'. It is a study of the users of the services provided by the agency, not the agency itself.

**CMHC Project Officer :** Anna Lenk

**Division :** External Research Program

**AVAILABILITY :** Publication is not available

**CIDN :** 2305 0200013

**STATUS :** New Project

## HOUSE CONSTRUCTION INDUSTRY

### HOUSING CONSTRUCTION INDUSTRY: CHALLENGES AND OPPORTUNITIES FOR THE 21ST CENTURY

This research project will examine the evolution of the structure of the housing industry in Canada since the mid-1980s, the industry's current and expected future challenges in the period to 2010, and the ways it might adapt. The study is will also identify research issues which merit further investigation and study.

**CMHC Project Officer :** Ian Melzer

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 1987 0200001

**STATUS :** Ongoing Project

## SKILL SHORTAGES IN THE RESIDENTIAL CONSTRUCTION INDUSTRY

This paper looks at why labour shortages arise and persist, the possible consequences of labour shortages, the tools available to manage labour supply and demand, policy implications and future research requirements.

*Rev. edition. Prepared by Morley Gunderson, MKG Associates. CMHC Project Officer: David D'Amour. Ottawa: Canada Mortgage and Housing Corporation, 2001. 125 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## STUDY ON THE HOUSING SECTOR'S PRODUCTIVITY GROWTH

The objectives of this project are to measure the residential construction sector's productivity, assess the productivity drivers in the sector and, where feasible, by housing type, explain the productivity trends and explain the regional variations.

**CMHC Project Officer :** Eric Tsang

**CIDN :** 2406 0100001

**Division :** Strategic Policy & Planning

**STATUS :** Planned

**AVAILABILITY :** Publication is not available

## HOUSING

### HOUSING IN CANADA (HIC) CD-ROM DATA BASE

CMHC has developed an electronic CD data base called Housing In Canada (HIC) which provides housing interest groups with direct hands-on access to comprehensive data on households and housing conditions using CMHC's custom 1996 housing conditions indicators data derived from the 1996 Census and comparing it with data from the 1991 Census. The data base enables groups to have the hands-on capability to examine how and why housing conditions are changing.

HIC presents key demographic and socio-economic data (e.g. household type, income, age, gender and period of immigration) matched to comprehensive housing data (e.g. dwelling type, age and condition; tenure, shelter cost, suitability, affordability and the existence and depth of housing need). HIC employs today's recognized standards for housing suitability, adequacy and affordability to facilitate the assessment of the state of Canada's housing.

The software profiles most of Canada's households: non-farm, non-Native; non-farm, Native off-reserve; Native on-reserve; and farm households. HIC includes aggregated data for: Census Metropolitan Areas (CMAs) and main sub-divisions (CSDs); Regional Municipalities; residual non-CMA urban and urban areas; and provinces, territories and Canada. The data provided focuses on 199, but provides comparison data for 1991 to enable users to identify the direction and extent of recent changes in community's housing.

The bilingual 20/20 software (included) is available in the form of easily manageable CD-ROM disks; for each province and territory, and for each census metropolitan area (CMA). Each provincial/territorial CD-ROM contains Canada level data on it to provide context for all analyses. Similarly, each CMA CD-ROM contains two sets of all CMA average data for comparison; one set for the province in which the CMA is located and the other for all of Canada.

**CMHC Project Officer :** John Engeland

**CIDN :** 2126 0200002

**Division :** Research Division

**STATUS :** Completed

**AVAILABILITY :** Further information on HIC is available from CMHC's web site:  
<http://www.cmhc-schl.gc.ca/mkrinfo/housingincanada.html>

## INTERGENERATIONAL HOUSING TRENDS AND CHALLENGES

This project's objective is to complete an issue paper on intergenerational housing trends and challenges.

**CMHC Project Officer :** Leanne Elliott

**CIDN :** 2409 0100001

**Division :** Strategic Policy & Planning

**STATUS :** Planned

**AVAILABILITY :** Publication is not available

## SPECIAL STUDIES ON 1996 CENSUS DATA

This project is composed of developing a series of concise studies that explore the housing conditions reported in the 1996 Census of Canada. Six studies are currently completed and available on the CMHC web site:

Research Highlights Issue 55-1 Canadian Housing Conditions uses data primarily at the national level, explains commonly used terminology, and examines the largest groupings of households.

Research Highlights Issue 55-2 Housing Conditions in Metropolitan Areas examines Canada's 25 Census Metropolitan Areas.

Research Highlights Issue 55-3 Housing Conditions of Immigrants discusses the housing conditions of households whose primary maintainer is an immigrant to Canada.

Research Highlights Issue 55-4 Housing Canada's Children examines the housing environment of Canada's children.

Research Highlights Issue 55-5 Changes in Canadian Housing Conditions, 1991-96 examines changes in the housing conditions of non-farm, non-Native households between the 1991 and 1996 Censuses.

Research Highlights Issue 55-6 Housing Conditions of Native Households examines the housing conditions of households defined as Native using the self-identification definition available in the Census for the first time in 1996.

Subsequent studies are planned to examine smaller groupings of interest, such as: seniors; people who live alone; families; tenants; women; and young people.

**CMHC Project Officer :** Ian Melzer

**CIDN :** 1988 0200003

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Canadian Housing Information Centre and on the Internet



## ACT REGIONAL STAKEHOLDER INFORMATION SESSIONS

Ten information sessions will be held across Canada to inform housing stakeholders of regulatory reform solutions that have been generated under the Affordability and Choice Today program. The intent is to encourage replication of these solutions. Stakeholders will include municipalities, home builders, non-profit housing groups and other housing specialists.

**CMHC Project Officer :** Susan Fisher

**STATUS :** Ongoing Project

**Division :** Research Division

**AVAILABILITY :** No Report will be Published

## AFFORDABLE HOUSING ADVISOR

This project will assemble an electronic database of strategies that have been successfully used to improve housing affordability. These strategies will appear under categories of activity such as: Policy and Regulation; Housing and Community Design; Financing and Tenure; Construction and Technology; Operations and Management; and Redevelopment. Each strategy will be explained and illustrated with two example projects. The database will be accessible through the CMHC web site and will be fully searchable and linked to relevant sources of information of the strategies and examples. The sources will include CMHC reports, publications by other organizations and individuals and web sites of public, non-profit and non-government organizations. This database would be a virtual encyclopedia on affordable housing tools.

**CMHC Project Officer :** Fanis Grammenos

**CIDN :** 2053 0200004

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## COCHRANE, ALBERTA, COMMUNITY-BASED AFFORDABLE HOUSING INITIATIVE, PLANNING AND ENGINEERING SERVICES DEPARTMENT, TOWN OF COCHRANE, ALBERTA = INITIATIVE DE LOGEMENTS À PRIX ABORDABLE DE LA VILLE DE COCHRANE (ALBERTA), SERVICE DE L'URBANISME ET DU GÉNIE, VILLE DE COCHRANE (ALBERTA)

The objective of this project was to develop affordable housing policies that could be incorporated into the town of Cochrane, Alberta, Land Use Bylaw and to develop a set of guidelines for implementation of the policies by town planners in conjunction with the development industry.

The Cochrane Town Council amended its Land Use Bylaw to

- allow accessory (secondary) suites and garden suites;
- increase densities in all residential zoning categories;
- to create a new zoning category for multiples taller than four storeys; and the

Town Council adopted a replacement Municipal Development Plan that incorporated new policies that addressed requirements for housing choice availability.

By the summer of 1999, Cochrane was seeing positive results from the affordable housing project and the resultant regulatory reforms.

*Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2000. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 48 pages*

Order number: 62000

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## GUIDE TO DEVELOPING A MUNICIPAL AFFORDABLE HOUSING STRATEGY

The objective of this study is to develop a guide on how to design, implement and monitor a municipal affordable housing strategy, including information on the range of instruments that could be included in such a strategy. The project team will undertake the following key tasks to ensure the guide is of greatest use to its intended users, municipalities, including:

1. a literature and Internet search on municipal housing strategies and housing policy tools;
2. a national scan of provincial officials and non-governmental organizations and consultations with municipalities with experience in conducting an affordable housing strategy;
3. consultations with municipalities that do not have a housing strategy but who are willing to work with the consultants to ensure that the guide addresses practitioners' needs; and
4. consultations with local community and non-profit housing developers and affordable housing sponsors.

**CMHC Project Officer :** Fanis Grammenos

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2274 0200001

**STATUS :** Ongoing Project

## PHILANTHROPIC SUPPORT FOR AFFORDABLE HOUSING: FINAL REPORT

This research project is aimed at providing sponsors of affordable housing with a detailed situational analysis background overview of the philanthropic sector. The study includes an overview of the financial economics associated with producing affordable housing in Canada; an examination of the charitable sector and donor community; and a look at the tax implications of donations to charities and non profit organizations. The report describes the nature, characteristics and regional variations in charitable giving in Canada; sources of charitable donations and funding levels as well as alternative fund raising methods used to solicit financial support. This component of the research also provides an overview of the nature, size and characteristics of the donor community in Canada and presents practical insights into the size, nature, geographic distribution and related factors impacting donations from individual Canadians, the corporate community and foundations. Sixteen case studies are used to illustrate how affordable housing sponsors have been able to obtain philanthropic support for creating affordable housing projects.

*Prepared by Manifest Communications Inc. in association with Steve Pomeroy, Focus Consulting and François Lagarde. CMHC Project Officer: David Metzak. Ottawa: Canada Mortgage and Housing Corporation, 2000. (Housing Affordability and Finance Series) ix, 134 pages.*

Order Number: 62146

NOTE 1: Aussi disponible en français sous le titre : Appui des organisations philanthropiques à la production de logements abordables (62147)

NOTE 2: No. 67 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## HOUSING AFFORDABILITY

### REFINING OF CMHC HOUSING AFFORDABILITY INDICATORS

The purpose of this project is to undertake a study to refine CMHC housing affordability indicators.

**CMHC Project Officer :** *Louis Trottier*

**CIDN :** 2320 1000001

**Division :** Market Analysis Centre

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### RISK SHARING AND LOAN GUARANTEE MEASURES

The purpose of this project is to examine the Canadian and United States experience, primarily within the public sector domain, of the application of risk sharing and loan guarantee measures employed by community and affordable housing development agencies, lenders, mortgage securitizers and insurers as a means to facilitate the production of affordable housing. The study is to examine the potential transferability and adaptability of the US measures to the Canadian affordable housing environment and context. To the extent possible, stakeholder testimony, anecdotal evidence and program/project evaluations completed to date will be examined to assess the relative success of such measures.

**CMHC Project Officer :** *Lisa Daher*

**STATUS :** New Project

**Division :** Research Division

**AVAILABILITY :** Publication is not available

### STATE AND PROVINCIAL AFFORDABLE HOUSING MANDATES AND MEASURES

The objective of this project is to identify and describe affordable housing mandates and measures being used by various states in the U.S. and provinces in Canada which essentially encourage their municipalities to use the regulations associated with the development approval process, but without financial subsidies, to encourage the private sector to provide affordable housing. The final report will be of interest to provincial and municipal planners, housing analysts, finance officers, and third sector housing providers.

**CMHC Project Officer :** *David Metzak*

**CIDN :** 1670 0200003

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## HOUSING AND IMMIGRATION

### HOUSING CHOICE AND ADAPTABILITY FOR AFRICAN REFUGEES: THE CANADIAN AFRICAN NEWCOMER AID CENTRE, TORONTO (ONTARIO) = CHOIX ET ADAPTABILITÉ DES LOGEMENTS DESTINÉS AUX RÉFUGIÉS AFRICAINS : THE CANADIAN AFRICAN NEWCOMER AID CENTRE, TORONTO (ONTARIO)

This report describes the work of the Canadian African Newcomer Aid Society of Toronto (CANACT), to develop an adaptable housing model for refugees which would take into consideration the unique needs of refugees, including the changes likely to occur in family size and composition through family reunification. Formally called "Housing Choice and Adaptability for Refugees", the project was undertaken in cooperation with Toronto's Department of Housing and the Department of Planning and Development. The project set out to:



## HOUSING AND IMMIGRATION

- consult with African refugees to determine their present and future housing needs;
- translate these needs into design guidelines;
- identify regulatory issues relevant to the creation of such housing; and
- acquire land and build a demonstration project of 16 units.

Although the CANACT project never achieved its ultimate goal of actually building homes or developing a viable ownership model, it produced a blueprint that other housing providers can use to develop their own housing projects for new immigrants and refugees. The City of Toronto's study of the zoning implications of CANACT's design guidelines can also be useful to other municipalities as it identifies the kind of permitted use categories needed to accommodate the housing needs of African refugees and newcomers.

*Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study)*

Order Number: 61993

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## HOUSING EXPORT OPPORTUNITIES

### ASSESSMENT OF PREFABRICATED BUILDING SYSTEMS INDUSTRY

This study will research the prefabricated building industry in Sweden and Finland.

**CMHC Project Officer :** Louis Musto

**CIDN :** 1979 0200002

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

### CANADA POLAND RESIDENTIAL REAL ESTATE INVESTMENT MODEL: AN EVALUATION OF POLAND'S RESIDENTIAL REAL ESTATE MARKET: SUMMARY

This evaluation of Poland's residential real estate market provides information on the following:

- An economic overview
- Foreign investment regulations
- Residential construction
- The property market
- The legal framework for a housing financing system
- Development prospects and an Investment model
- Construction permits, the Polish standardization system, and custom duties
- Types of housing systems preferred by Polish consumers
- Business practices and useful contacts.

*Ottawa: Canada Mortgage and Housing Corporation, Canadian Housing Export Centre, 2001. 21 pages.*

Note: Publié aussi en français sous le titre : Étude de marché dans le secteur de l'immobilier résidentiel

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## CANADIAN HOUSING EXPORTERS IN THE KOREAN HOUSING MARKET

The objective of this project is to analyze the Korean housing market and to identify market potentials and opportunities for Canadian housing exporters in the Korean housing market.

**CMHC Project Officer :** Jay Thakar

**CIDN :** 2332 0900001

**Division :** Canadian Housing Export Centre

**STATUS :** Planned

**AVAILABILITY :** Publication is not available

## CONTRIBUTION TO A STUDY ON PACIFIC RIM MARKETS FOR TERMITE-RESISTANT WOOD PRODUCTS

The objective of this project is to study the Pacific Rim markets for termite-resistant wood products.

**CMHC Project Officer :** Jay Thakar

**CIDN :** 2104 0900001

**Division :** Canadian Housing Export Centre

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## DEVELOPMENT OF A GUIDE TO THE UNITED KINGDOM BUILDING REGULATIONS

The objective of this project is to develop a guide on the building regulations in the United Kingdom.

**CMHC Project Officer :** Terry Robinson

**CIDN :** 1953 0900

**Division :** Canadian Housing Export Centre

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## DEVELOPMENT OF AN EXPORT TOOL-KIT FOR CHINA

This project's objective is to prepare a comprehensive assessment and collection of information pertaining to the export of Canadian housing product to China.

**CMHC Project Officer :** Murray Rasmussen

**CIDN :** 2347 0900001

**Division :** Canadian Housing Export Centre

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## HOUSING EXPORT OPPORTUNITIES

### HOUSING AND BUILDING MARKET IN CHILE, CHINA, GERMANY, JAPAN, KOREA, POLAND, UNITED KINGDOM

For each of the countries listed above, this report provides the following information:

- quick facts on the country
- characteristics of its housing and building products market
- building technology standards
- building codes and standards
- information on the business environment, domestic and foreign competition, market entry strategies and specific business opportunities
- key contacts, events, references, and internet sources of information.

*Prepared for Canada Mortgage and Housing Corporation. Prepared by Department of Foreign Affairs and International Trade. Ottawa: Canada Mortgage and Housing Corporation, 2001.*

*Publié aussi en français sous le titre : Le marché du logement et de la construction en : Allemagne, Chili, Chine, Corée, Japon, Pologne, Royaume-Uni*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### INVESTIGATION OF CO-VENTURES AND EXPORT POTENTIAL FOR BUILDING PRODUCTS AND MATERIALS RELATED TO SUSTAINABLE DEVELOPMENT IN CHINA

The purpose of this project is to explore the opportunities that exist in China for co-ventures and the export of Canadian products, technology and materials related to sustainable development to lower the impact on the natural environment and/or promoting a healthy indoor environment.

**CMHC Project Officer :** Murray Rasmussen

**STATUS :** Planned

**Division :** Canadian Housing Export Centre

**AVAILABILITY :** Publication is not available

### PENETRATION OF THE MULTIPLE HOUSING SECTOR IN THE UNITED STATES

This document is intended to be used as a reference tool by prime contractors and trade contractors alike working in the contractual construction industry and who envision expanding their business into the United States. The purpose of this study is to identify the ten American metropolitan regions that offer the highest potential concerning residential real estate, particularly apartment complexes, and the ten metropolitan regions of the eastern United States that offer the highest potential for non-residential real estate. The study also outlines the methods used by the current exporters to bypass any barriers to entry.

*Prepared by Claire Piché and Samir Abboud of COPRIM. Prepared for Canadian Housing Export Centre, Canada Mortgage and Housing Corporation and Association de la construction du Québec. CMHC Project Officer: Carol M. Kerley. Ottawa: CMHC, 2000.*

**NOTE :** Aussi disponible en français sous le titre : Pénétration du secteur de l'habitation multiple aux États-Unis

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre and available in PDF file on CMHC's Web site. To download this document visit CMHC's Web site at :

[http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu\\_001.cfm](http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu_001.cfm)



## RESEARCH STUDY ON THE HOUSING MARKET IN THE UNITED KINGDOM

This report describes the housing market in the United Kingdom, providing an overview of the market, statistics on newly built housing, and information on its housing technology. It covers the major challenges facing UK housing and outlines the building technology and standards environment. The final section deals with the key issues concerning imported housing and products to the UK, trading relationships, and recommended market entry strategies for Canadian housing companies. A typical performance specification for timber frame use in the UK is included.

*Ottawa: Canadian Housing Export Centre, Canada Mortgage and Housing Corporation, 2000. 52 pages*

NOTE : Aussi disponible en français sous le titre : Étude sur le marché de l'habitation au Royaume-Uni

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## RETROFITTING RUSSIA'S HOUSING STOCK: OPPORTUNITIES AND OBSTACLES FOR CANADIAN EXPORTERS

The purpose of this project is to identify several basic business development strategies which could be employed by Canadian firms to practically and realistically respond to the market opportunities represented by the Russian housing sector.

**CMHC Project Officer :** Oliver Drerup

**Division :** External Research Program

**AVAILABILITY :** Publication is not available

**CIDN :** 1830 0200001

**STATUS :** Ongoing Project

## STUDY OF THE MIDWEST BUILDING PRODUCTS MARKET IN THE REGIONS OF ILLINOIS, WISCONSIN AND MISSOURI

The purpose of this project is to undertake a study to provide Canadian companies with a general overview of the market forces within the building products sector in the three state regions of Illinois, Wisconsin, and Missouri.

**CMHC Project Officer :** Carol M Kerley

**Division :** Canadian Housing Export Centre

**AVAILABILITY :** Publication is not available

**CIDN :** 2172 0900001

**STATUS :** Ongoing Project

## STUDY ON U.S. RENOVATION MARKET

This study covers recent changes, trends, and opportunities for the renovation market in the United States. It includes an overview of the market, forecasts and detailed lists of the top American remodeling companies, independent lumber yards and home centres, leading retailing chains, home improvement product retailing headquarters, wholesaling cooperatives, distributors, representatives and agents.

*Prepared by The Starr Group Inc. Prepared for Canadian Housing Export Centre, Canada Mortgage and Housing Corporation. CMHC Project Officer: Carol M. Kerley. Ottawa: CMHC, c1999.*

NOTE : Aussi disponible en français sous le titre : Étude sur le marché de la renovation aux États-Unis

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## SUSTAINABLE DEVELOPMENT IN CANADA

The objective of this project is to investigate the application of Canadian sustainable development in the Japanese market.

**CMHC Project Officer :** Jay Thakar

**STATUS :** Ongoing Project

**Division :** Canadian Housing Export Centre

**AVAILABILITY :** Publication is not available

## TRENDS AND CHANGES IN JAPANESE BUILDING REGULATIONS

To facilitate the development of export strategies for the Japanese housing market, this report provides information on new government regulation in Japan and the effect of these regulations on imported housing.

- ➔ The report provides an in-depth assessment of the four key issues driving the sweeping changes taking place in Japan's housing industry: Revised Building Standard Law, mandatory 10 year product warranties, Housing Quality Assurance Law (HQAL), and new Government Housing and Loan Corporation (GHLC) criteria.

*Prepared by David Cohen and Christopher Gaston. Ottawa: Canada Mortgage and Housing Corporation, c2001. 43 pages.*

NOTE : Aussi disponible en français sous le titre : Tendances et changements au niveau des règlements de construction japonais

**STATUS :** New Completed Report

**AVAILABILITY :** Available in PDF file on CMHC's Web site. To download this 43 page document visit CMHC's Web site at:  
[http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu\\_010.cfm](http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu_010.cfm)

## TRENDS IN THE JAPANESE HOUSING MARKET

Japan is one of the world's largest housing markets. Canada is a leading exporter of building materials and services to Japan and has actively promoted the use of Canadian housing systems through a variety of initiatives. Imports of housing, however, comprise only a small proportion of total Japanese housing activity so the potential to expand this market share presents attractive opportunities for Canadian housing producers and suppliers. This report provides 1. an overview of recent trends in the Japanese housing market and housing imports; 2. an assessment of market opportunities for Canadian housing companies in Japan; and 3. identifies a number of potential market niches including:-- large-scale wooden buildings;-- exterior finishes on buildings in quasi-fire protection areas;-- energy-efficient and healthy housing;-- housing for the elderly; and-- the renovation market.

*Prepared by Greg Lampert Economic Consultant and Shin Ikehata, Cyber Builders International Inc.  
Prepared for Canadian Housing Export Centre, Canada Mortgage and Housing Corporation. Ottawa:  
CMHC, 1999, c2000. 66 pages*

NOTE : Aussi disponible en français sous le titre : Tendances du marché de l'habitation japonais

**STATUS** : New Completed Report

**AVAILABILITY** : Canadian Housing Information Centre and available in PDF file on CMHC's Web site. To download this document visit CMHC's Web site at : [http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu\\_001.cfm](http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu_001.cfm)

## UPDATE OF THE STUDY ON MID-ATLANTIC BUILDING MATERIALS MARKET

To support an update of the study entitled "Business Opportunities for Canadian Building Materials Manufacturers in the Mid-Atlantic Region of the U.S. of America" with new actual and forecast data.

**CMHC Project Officer** : Carol M Kerley

**CIDN** : 2228 0900001

**Division** : Canadian Housing Export Centre

**STATUS** : Ongoing Project

**AVAILABILITY** : Publication is not available

## HOUSING FORECASTING AND DEMAND

### DEMOGRAPHIC CHANGES AND REAL HOUSING PRICES IN CANADA

With the aging of the baby-boom generation, the number of young households is falling in Canada. This study examines the contentions of the demographer David Foot, and of earlier work by Mankiw and Weil, that in such a population, the number of home buyers is bound to decrease, causing the prices of residential real estate to drop substantially. In addition to reviewing the relevant economic literature, it constructs econometric models using Canadian national and provincial data and uses them to assess whether expected demographic changes in Canada are likely to trigger a pronounced downward trend in residential real estate prices.

The study concludes that even if it is true that demographics may exert downward pressure on real estate prices, such impact will probably be dominant only in certain regions, depending even there on their rates of growth in real income. In other regions, the real price should have a tendency to rise.



## HOUSING FORECASTING AND DEMAND

Prepared by Mario Fortin and André Leclerc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Ian Melzer. Ottawa: CMHC, 1999, c2000. (Housing Affordability and Finance Series) 142 pages.  
Order Number: 62152

NOTE 1: Aussi disponible en français sous le titre : Les changements démographiques et le prix réel des logements au Canada (62153) 146 pages.

NOTE 2: No. 62 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

## HOUSING MARKET

### IMPACT OF CONVERSIONS OF RENTAL TO OWNERSHIP UNITS ON HOUSING MARKETS IN ONTARIO

This study seeks to generate a framework for addressing the changes in the availability of affordable housing stock in large Ontario cities through conversions of rental units and, by extension to understand the impact of these conversions on other components of the housing market, in particular the new homes market.

**CMHC Project Officer :** Alain Miguelez

**Division :** Market Analysis Centre

**AVAILABILITY :** Publication is not available

**CIDN :** 2226 100001

**STATUS :** Ongoing Project

## MORTGAGES AND HOUSING FINANCE

### EVOLVING IMPACT OF E-COMMERCE ON HOUSING FINANCE ACCESS AND AFFORDABILITY: US EXPERIENCE AND LESSONS FOR CANADA

The objective of this research is to examine the significant changes arising in the housing finance market place resulting from e-commerce and their impact on housing finance access and housing affordability. An overview of experience to date and international comparisons with the US will be instructive to Canadian stakeholders and will assist in developing and focusing a program of useful related directed research.

The research project will entail a literature review, Internet searches, interviews and discussions with knowledgeable US and Canadian industry participants, government regulatory agencies, housing sector stakeholders and other key informants.

**CMHC Project Officer :** Ian Melzer

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2389

**STATUS :** Ongoing Project

### EVALUATION OF THE PHYSICAL REQUIREMENTS TO GO UP ACCESS RAMPS IN MANUAL WHEELCHAIRS AMONG ADULTS AND SENIORS

This study concerns an analysis of the necessary physical requirements to go up access ramps in manual wheelchairs.

**CMHC Project Officer :** *Luis Rodriguez*  
**Division :** External Research Program  
**AVAILABILITY :** Publication is not available

**CIDN :** 2305 0200019  
**STATUS :** New Project

### EXAMINATION OF THE HOUSING CHOICES OF PERSONS WITH DISABILITIES

This project's objective is to have accurate information on the housing choices of people aged 15 and over with mobility and agility disabilities.

**CMHC Project Officer :** *Tom Parker*  
**Division :** External Research Program  
**AVAILABILITY :** Publication is not available

**CIDN :** 2144 0200019  
**STATUS :** Ongoing Project

### EXPERIENCES OF MOTHERS WHO USE WHEELCHAIRS IN HOMEMAKING AND CHILD CARE

This proposed study will use qualitative methods to examine the homemaking activities and experiences of mothers who use wheelchairs for mobility. It will explore the interactions among the home environment, gender, and disability.

**CMHC Project Officer :** *Tom Parker*  
**Division :** External Research Program  
**AVAILABILITY :** Publication is not available

**CIDN :** 2305 0200017  
**STATUS :** New Project

### HOUSING CONDITIONS OF PERSONS WITH HEALTH AND ACTIVITY LIMITATIONS IN CANADA, 1991: A RETROSPECTIVE

This study provides, for the first time, an overall perspective on the general housing conditions of Canadians with health and activity limitations. Being a retrospective, it is based on data from the 1991 Census of Canada linked to the post-censal Health and Activity Limitations Survey (HALS). By comprehensively profiling housing conditions in 1991, the study forms a foundation for work that CMHC plans to do in linking data from the 2001 Census of Canada with the subsequent Health and Activity Limitations Survey.

## PERSONS WITH DISABILITIES

The conclusions of the study are:

- Persons with disabilities are significantly more likely than other Canadians to be in core housing need, especially those who rent, are moderately or severely disabled, live alone, or are women or single mothers.
- Many need housing adaptations related to their disability but cannot afford them.
- Nonetheless, the great majority are satisfied with their present dwelling. Even most of those seeking change would prefer to adapt their current homes rather than move.

*Based on research by Aron Spector, Ark Research Associates for John Engeland, Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, c2000. (Distinct Housing Needs Series Research Report) ix, 24 pages.*

Order number: 62026

NOTE : Aussi disponible en français sous le titre : Conditions de logement des personnes aux prises avec des problèmes de santé et des limitations d'activité au Canada, en 1991 : Rétrospective

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## MAJOR MAINTENANCE AND RESIDENTIAL RENOVATION: A SURVEY OF MEANS TO IMPROVE THE ARCHITECTURAL ACCESSIBILITY OF EXISTING BUILDINGS

The objective of this project is to study the extent to which it is possible to integrate architectural accessibility into existing residential buildings during major maintenance or common renovation work planned by an owner.

**CMHC Project Officer :** *Rachelle Luengas*

**Division :** External Research Program

**AVAILABILITY :** Publication is not available

**CIDN :** 2021 0200001

**STATUS :** Ongoing Project

## SPACE EFFICIENT UNIVERSAL DESIGN INNOVATIONS

The research will evaluate design innovations which have been developed specifically to enhance access for people who use wheelchairs.

**CMHC Project Officer :** *Tom Parker*

**Division :** External Research Program

**Grant Recipient :** *Gloria M. Gutman*

*Professor, Gerontology Research Centre*

*Simon Fraser University*

*2800-515 West Hastings Street*

*Vancouver BC V6B 5K3*

**AVAILABILITY :** Publication is not available

**CIDN :** 2009 0200001

**STATUS :** Ongoing Project



### **ACTION PLAN FOR REVITALIZING A COMMERCIAL ARTERY: COLLECTIF EN AMÉNAGEMENT URBAIN HOCHELAGA-MAISONNEUVE, MONTRÉAL, QUÉBEC = PLAN D'ACTION POUR LA RVITALISATION D'UNE ARTÈRE COMMERCIALE : COLLECTIF EN AMÉNAGEMENT URBAIN HOCHELAGA-MAISONNEUVE, MONTRÉAL, QUÉBEC**

Hochelaga-Maisonneuve is a neighbourhood located in the east end of Montréal, Québec. In the fall of 1996, an umbrella group of local community organizations, the Collectif en aménagement urbain Hochelaga-Maisonneuve, received an A.C.T. grant in order to identify ways to revitalize a once vibrant section of Ste-Catherine Street in the southwestern part of the Hochelaga-Maisonneuve district. The project had three main objectives:

- modify zoning bylaws to encourage neighbourhood revitalization;
- improve the neighbourhood's image by minimizing factors that are driving away investment and people; and
- encourage property owners to participate actively in improving their community.

Specifically, the project team undertook the following activities:

- updated the study area's land-use maps;
- consulted with municipal housing authorities, local business associations and community groups; and;
- prepared a revitalization plan.

This A.C.T. initiative identified obstacles to revitalization found in the zoning bylaw as well as other factors contributing to the area's decline.

*Case study written by: Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2000. (Affordability and Choice Today (A.C.T.) Demonstration Project; ACT Case Study)*

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

### **BRINGING COMPUTERS INTO THE PERMITTING PROCESS, STRATHCONA COUNTY, ALBERTA = AUTOMATISATION DU PROCESSUS D'ÉMISSION DE PERMIS, STRATHCONA COUNTY (ALBERTA)**

This report describes the process followed by Strathcona County to develop a computerized permit processing system and data base, integrated with the existing tax roll and assessment data base. The objective of the project was to reduce red tape and streamline the application and approval process for development and building activities. Results achieved are documented and lessons for other municipalities considering a similar initiative are covered.

*Case study written by: Rowena E. Moyes. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2000. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 30 pages*

Order Number: 61992

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

### HOW CAPE BRETON REGIONAL MUNICIPALITY STREAMLINED RESIDENTIAL BUILDING PLANS APPROVALS BY IMPROVING THE QUALITY OF PLANS SUBMITTED FOR REVIEW: FIRE-RESCUE AND BUILDING SERVICES DEPARTMENT OF THE CAPE BRETON REGIONAL MUNICIPALITY, NOVA SCOTIA = COMMENT LA MUNICIPALITÉ RÉGIONALE DU CAP-BRETON A RATIONALISÉ L'APPROBATION DES PLANS DE CONSTRUCTION RÉSIDENIELLE EN AMÉLIORANT LA QUALITÉ DES PLANS PRÉSENTÉS POUR FINS D'EXAMEN : SERVICES DES INCENDIES ET DU BÂTIMENT DE LA MUNICIPALITÉ RÉGIONALE DU CAP-BRETON, NOUVELLE-ÉCOSSE

This report describes how the Cape Breton Municipality took a different approach to streamlining its residential building permit approval process. Where others focussed on relaxing standards or reorganizing their bureaucracy for greater efficiency, Cape Breton put its emphasis on the front-end of the system. It decided to improve the quality of the plans coming in for review.

The solution adopted by the Region was a training program to teach home builders and their designers how to complete and submit plans that are consistently code correct. Graduates of the course would be certified as "code-qualified" and plans submitted by them would require only a low-level review, meaning they could clear the system faster. For all practical purposes, their plans would arrive pre-approved.

Cape Breton conducted a trial run of its program in 1996 and began full implementation in the 1997 building season. The Region's average processing time for applications from "code-qualified" applicants has dropped to six days compared to an average of 14 days for the non-certified.

The Cape Breton experience can be easily duplicated and other municipalities could expect to reap the same benefits as Cape Breton. Staff would spend less time reviewing building plans and handling permit fee payments at a counter, so they would be free to do other work. The work environment for inspectors would improve because there would be fewer conflicts with builders over code violations.

There are also benefits for builders. They pay less to have their plans reviewed and significantly reduce the possibility of having to make expensive job-site corrections when inspectors spot code violations during construction.

*Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1998 (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study)*

32 pages

Order Number: 61997

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## HOW THE DISTRICT OF NORTH VANCOUVER BUILT COMMUNITY ACCEPTANCE FOR THE LEGALIZATION OF SECONDARY SUITES IN SINGLE FAMILY NEIGHBOURHOODS = COMMENT LE DISTRICT DE NORTH VANCOUVER EN EST VENU À FAIRE ACCEPTER PAR LA COLLECTIVITÉ LA LÉGISLATION DES APPARTEMENTS ACCESSOIRES DANS LES QUARTIERS CONSTITUÉS DE MAISONS INDIVIDUELLES

This case study describes how the District of North Vancouver built community acceptance for the legalization of secondary suites in single family neighbourhoods. Secondary suites meet a market requirement for low-rent housing, they are a form of urban intensification and they address various needs (mostly financial) of home owners. In spite of these benefits, there is real and perceived community resistance to secondary suites. This opposition is built upon apprehensions that suites adversely affect neighbourhood quality of life and that the people who inhabit them may not be the kind of folks you want living next door. After unsuccessful efforts to close down secondary suites, the municipality decided to try a different approach. The District exposed and deflated the mis-perceptions of residents and suite owners by publishing and promoting four factual documents that:

- profiled owners of secondary suites and their tenants showing how they compared to the rest of the population;
- analysed the cost factors involved in upgrading existing suites to make them building code-compliant, concluding that \$10,000 to \$15,000 was a typical outlay;
- examined the types of complaints the District received about secondary suites as justification for putting appropriate controls in place; and
- examined the Provincial building code issues involved.

These 4 documents were circulated to builders and developers and to 22 community and ratepayer groups for comment. In addition, the District staged a televised public forum on the issue to obtain input from the public at large. In the end, the District achieved what it wanted -- widespread community acceptance that secondary suites serve genuine needs and therefore deserve a place in the housing mix. The by-law Council passed in October 1997, to legalize secondary suites in single family zones reflected public input. It demands sufficient space for parking, requires that owners live in the home and that there be only one suite per house. District of North Vancouver officials think their experience can benefit other municipalities. The process they used, particularly the research methodology, could be followed by others. Asked what they learned from their experience that could help others, District officials cite three key points:

1. provide the public with factual information based on solid research;
2. find common ground (in this case, consensus focused on health and safety issues); and
3. adopt a non-punitive approach.

*Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 37 pages*

Order number: 61991

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products



### INCREASING HOUSING IN RURAL COMMUNITY CENTRES, BEAUBASSIN PLANNING COMMISSION, CAP-PELÉ, NEW BRUNSWICK = LA DENSIFICATION RÉSIDENTIELLE DANS LES CENTRES COMMUNAUTAIRES RURAUX, COMMISSION D'AMÉNAGEMENT BEAUBASSIN, CAP-PELÉ (NOUVEAU-BRUNSWICK)

This ACT case study briefly outlines the unrestrained development in rural areas of New Brunswick that was threatening the province's natural resources and creating unsustainable communities. It documents the work of the Beaubassin Planning Commission on behalf of the Beaubassin East Rural Community to examine ways to control sprawl and enhance community life in rural areas. The key to increasing residential density in non-serviced rural areas was to identify alternative ways to treat wastewater in a manner that protects the environment and maintains health standards. The Planning Commission:

- conducted research on innovative types of sewage and storm-water drainage systems
- assessed the feasibility of installing shared or community septic systems to dispose of wastewater; and
- recommended modifications to provincial regulations so as to permit increased densities in non-serviced rural community centres.

As a result of these regulatory changes, property owners in designated community centres can now build a single-family home on a 2000 square metre lot, one-half the previous minimum lot size. The revised zoning bylaw also permits the construction of a second building on a 4,000 square metre lot containing a single-family home. The report outlines how the new zoning regulations enable the Beaubassin East Rural Community to offer a wider range of affordable housing and increase both the speed and flexibility of the development approval process.

*Case study written by: Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 34 pages*

Order Number: 61995

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

### MUNICIPAL SURVEY OF REGULATORY REFORM

Through a survey of over 100 Canadian municipalities, the purpose of this study is to collect information on the status and effectiveness of regulatory reforms aimed at increasing housing affordability and choice. The survey will also identify housing-related issues considered to be key priorities by municipalities. The final report and research highlight are expected in July 2001 and will be of interest to municipalities, builders, non-profit housing groups and housing professionals.

**CMHC Project Officer :** Susan Fisher

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2279 0200001

**STATUS :** Ongoing Project

## **ONE-STOP APPROVAL FOR MINOR RESIDENTIAL RENOVATIONS, ANDRÉ FORTIN, ARCHITECT, MONTRÉAL, QUEBEC = PROJET D'AUTORISATION INSTANTANÉE POUR LES TRANSFORMATIONS RÉSIDENTIELLES MINEURES, ANDRÉ FORTIN, ARCHITECTE, MONTRÉAL (QUÉBEC)**

This report describes the work of André Fortin to improve the permit issuance process for minor residential renovation projects in the City of Montréal. This type of renovation project is frequently undertaken by the property owner without the assistance of a building professional and sometimes without a permit. In doing so, construction safety and quality, and architectural integration are adversely affected. Most homeowners lack the specialized technical knowledge required to prepare the plans and specifications that must be submitted to receive a building permit. Homeowners are often unfamiliar with the approval process, which can be complicated and lengthy, and some find little technical support available to them.

André Fortin, a local architect, was awarded an A.C.T. grant to develop a series of technical guides that help homeowners in the City of Montréal prepare permit applications for minor residential renovations. Separate guides were created for different types of renovation projects such as:

- converting basements to apartments;
- minor additions or interior renovations that would provide additional housing; and
- renovations that make the existing living space accessible to persons with disabilities.

The guides contain sample designs as well as advice on regulations in force and the scope of construction work required. The guides, as well as meetings with municipal staff, provide homeowners with technical support, reduce the documentation required, and speed up the approval process for minor residential renovation projects. This encourages good quality renovation work that complies with existing municipal regulations and reduces administration costs. The report includes a sample technical guide for building a deck and a sample application form for a basement unit dwelling. The technical guides are a useful reference for all Canadian municipalities using National Building Code regulations.

*Case study written by: Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999. (Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project; ACT Case Study) 32 pages*

Order Number: 61999

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## **SURREY'S USE OF INTERACTIVE TOUCH-SCREEN TECHNOLOGY TO EXPEDITE CLIENTS REQUESTS FOR BUILDING PERMIT AND DEVELOPMENT PROCESS INFORMATION: THE CITY OF SURREY PLANNING AND DEVELOPMENT DEPARTMENT = UTILISATION DE LA TECHNOLOGIE INTERACTIVE À ÉCRAN TACTILE PAR LA VILLE DE SURREY AFIN D'ACCÉLÉRER LE TRAITEMENT DES DEMANDES DE PERMIS DE CONSTRUIRE ET D'INFORMATION SUR LE PROCESSUS D'AMÉNAGEMENT : SERVICE D'URBANISME ET D'AMÉNAGEMENT DE LA VILLE DE SURREY**

This case study report documents the use of touchscreen and computer technology by the City of Surrey, B.C. so individuals seeking information about land development and building permit policies can serve themselves. The City says its Touchscreen Info-Centre helps streamline permit handling



## REGULATORY REFORM

and enhance customer service. Since delays in construction cost money, the kiosks serve the cause of housing affordability by making permit issuance procedures more efficient. The methodology used to create them could be easily emulated by any other municipality.

*Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2000. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study)*

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

**\*\*See Also:** *Australian Building Regulation and Liability Reforms*, p. 59

## RENOVATION AND INSPECTION

### DISINVESTMENT AND THE DECLINE OF URBAN NEIGHBORHOODS

The project aims to develop an understanding of the forces and factors that trigger or accelerate neighborhood decline; create a consensual framework for action that can stem or reverse the housing decline spiral; ascertain the role of investment in housing as a primer for regeneration and identify opportunities for concrete action involving partnerships. Three cities that have experienced inner neighborhood decline and three that have successfully prevented decline are used as the basis for the analysis. Lessons are drawn about strategies or mechanisms that can arrest decline before it becomes a self-reinforcing spiral.

**CMHC Project Officer :** Fanis Grammenos

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2124 020001

**STATUS :** Ongoing Project

## RENTAL HOUSING

### ANALYSIS OF PENSION AND RRSP INVESTMENTS IN CANADIAN RENTAL HOUSING

This study assesses whether Canadian registered pension plans (RPPs) and retirement savings plans (RRSPs) currently under-invest in rental housing, and if so, whether there are specific obstacles to investment and policy options that would potentially increase investment. The study methodology involves an integrated approach consisting of five elements:

- a review of the legislative and regulatory environment;
- a synthesis of the theoretical and empirical literature on modern portfolio theory;
- a survey of pension funds and money managers;
- a comparative assessment of the Canadian/U.S. environments and results; and
- a quantitative analysis of rental housing investments by RPPs/RRSPs.

The primary focus of the study is on equity investments. The study finds that RPPs/RRSPs hold only minuscule amounts of rental housing investments. The evidence presented indicates that there is substantial scope for increasing RPP/RRSP investment in rental housing, assuming current obstacles can be removed. Any significant boost in the flow of such savings to rental housing could substantially increase equity investments in the sector and potentially lower cost and rents. The study identifies a number of specific obstacles to investment and makes suggestions for improving the investment climate.



## RENTAL HOUSING

*Prepared by Alex S. MacNiven. CMHC Project Officer: Ian Melzer. Ottawa: Canada Mortgage and Housing Corporation, 2001 (External Research Program) 183 pages*

NOTE : No. 79 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### ASSESSMENT REPORT ON RENTAL HOUSING TAXATION IN CANADA

The objective of this project is to write an assessment report on rental housing taxation in Canada which will identify all rental housing and related tax provisions; explain how each of these rental housing and related tax operates, including the use of illustrative numerical examples in each and every case; and discuss the generally-accepted criteria and a feasible methodology for determining the appropriateness of the current taxation regime applicable to rental housing.

**CMHC Project Officer :** Eric Tsang

**CIDN :** 2405 0100002

**Division :** Strategic Policy & Planning

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

### INVESTMENT IN RESIDENTIAL RENTAL HOUSING IN CANADA: LESSONS LEARNED FROM STUDIES AND RESEARCH

The objective of this project was to identify the reasons that lead investors to include rental properties in their portfolios. The work consisted of a review of the literature addressing the choice of residential rental properties as investments and the place of such investments within investor portfolios. The consultant therefore had to present the different theories and approaches serving to determine the criteria used by investors.

This review first revealed the lack of reliable data on real estate return. Without such data, the empirical properties of this type of investment, and particularly its diversification effect, cannot be established accurately. The absence of any Canadian studies on this subject is also noted. In spite of these findings, certain studies tend to demonstrate that taxation related to rental housing investments has had a significant impact on the inclusion of such investments in investor portfolios. There is also the strong correlation between real estate return and inflation that may have encouraged investors to include such investments in their portfolios to protect their return against inflation.

*Prepared by Mario Fortin. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Benoît Sanscartier. Ottawa: CMHC, 2000, c1996.*

NOTE: Issued also in French under the title: Investissement dans le logement locatif résidentiel au Canada : leçons des études et avenues de recherche

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### NON-PAYMENT OF RENTS AND THE HEALTH OF THE RENTAL SECTOR IN QUEBEC

This research will measure the extent and spatial distribution of the non-payment of rents in Quebec and its economic impact on the rental sector; identify the socio-economic and demographic factors that could explain the growth of this phenomenon as observed in the number of actions brought by landlords; analyze the regulations governing the processing of recovery-termination cases in view of improving the current procedure at the *Régie du logement*.

**CMHC Project Officer :** Charles Fortin

**CIDN :** 2305 0200018

**Division :** External Research Program

**STATUS :** Planned

**AVAILABILITY :** Publication is not available

### NON-REGULATORY INTERVENTIONS FOR ROOMING HOUSES/SROS AND TENANTS

This project will document non-regulatory initiatives that have been undertaken in Canada and the US that have had the effect of conserving the rooming house stock and stabilizing tenancies.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2432 0200

**Division :** Research Division

**STATUS :** Planned

**AVAILABILITY :** Publication is not available

### REGULATORY FACTORS IN THE RETENTION AND EXPANSION OF ROOMING HOUSE STOCK: FINAL REPORT

This study was carried out to develop a comprehensive picture of how rooming houses are regulated across the country and, furthermore, how those regulations have affected the number and type of rooming houses over the years. A review of recent literature, together with profiles of rooming house regulatory practices in 11 major centres across Canada, found:

- that most municipalities follow similar regulatory approaches based on a combination of zoning regulations, maintenance and occupancy standards, building standards, fire-safety standards, public health standards and licensing laws;

- the lack of co-ordination in the application and enforcement of these regulations in many municipalities is creating concerns among operators and other stakeholders in the rooming house sector;

- there is a growing demand for rooming house-type accommodation due to such factors as growth in single person households, increasing homelessness and growing student needs;

- supply factors such as shrinking vacancy rates, escalating rents, long social housing waiting lists and lack of new social housing development are placing growing pressure on the rooming house sector.

The report identifies a number of lessons for effective enforcement and outlines innovative regulatory practices that have been adopted by municipalities such as the City of Edmonton and the City of Winnipeg to reduce regulatory barriers and costs.

*Prepared by The Starr Group Inc. in association with Richard Drdla Associates. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2000.*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## COMMUNITY DESIGN: AN ANALYSIS OF DENSITY MEANINGS AND DEVELOPMENT OF A DESIGN TOOL

The study will address how Land Use Density (LUD) stipulations can impact and/or interplay with the various other system components of community plan-making,, e.g. open space, schools, retail, etc.

**CMHC Project Officer :** Doug Pollard

**CIDN :** 1998 0200001

**Division :** External Research Program

**STATUS :** Ongoing Project

**Grant Recipient :** William T. Perks

Principal, William Perks Professional Services

2505 - 5th Street S.W.

Calgary AB T2S 2S2

**AVAILABILITY :** Publication is not available

## EFFECTS OF DEVELOPMENT CHARGES ON URBAN FORM

The purpose of this research project was to conduct a nation-wide survey of builders and developers to determine the effects of development charges on industry decisions related to residential densities, location and timing. Case studies in selected cities explore in more detail how specific development charge regimes are affecting residential development patterns.

This report looks at the effects of development charges (dc's) on industry decisions related to residential densities, location and timing. The first phase of the work consists of a survey of 1,214 builders and developers; 265 responses were submitted (22%), representing firms ranging in size from 5 to 60 employees. All of the firms are located in urban regions consisting of more than one municipality. Some of the results are presented below.

- Most of the respondents (86%) indicated that differences in development charge fees among the municipalities in their respective urban regions have at least some impact on their regional locational decisions; 32% indicated a major impact.
- Slightly more than 17% of respondents said that they always locate in municipalities with lower dc's, while 69% said that they sometimes favour areas with lower dc's.
- When locating within a municipality where dc's vary by location, 64% of respondents said that "area-specific" charges have a "major" or "medium" impact on their locational decisions; of these, 20.5% "always" located in lower-charge areas, while 63.6% "sometimes" located in lower-charge areas.
- A majority of respondents (54.5%) thought that development charges have a "major" or "medium" impact on their decisions related to lot sizes; of these, 56.5% thought that they tended to decrease lot sizes.
- 31.4% of respondents felt that the dc's in their respective municipalities favour detached houses; 24.4% said they favour attached houses; 18.6% said multiples; 14.0 thought they encourage a mix of houses; and the rest didn't know.

Prepared by Ray Tomalty, Peck & Associates in association with Christine Warne and Pip White of Urban Aspects. Ottawa: Canada Mortgage and Housing Corporation, 2000.

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



### PRO-HOME: A PROGRESSIVE, PLANNED APPROACH TO AFFORDABLE HOME OWNERSHIP

This study describes an incremental or progressive approach to residential development, the Pro-Home approach, and examines its potential to increase access to affordable home ownership in Canada.

Pro-Home refers to an incremental approach to housing development whereby households enter the market at a level they can afford, and over time, alter or expand their housing in accordance with their financial means and housing needs. Using lessons learned from the unplanned residential developments that took place in Toronto prior to 1950, the Pro-Home proposes a planned and progressive approach to housing development.

This study is organized in the following five parts:

- Part I outlines the context underpinning the Pro-Home concept, namely, the need to introduce new practical solutions to address the growing problem of housing affordability in major urban areas in Canada.
- Part II reviews a number of Canadian and international precedents of owner-built or incremental housing, tracing how progressive approaches to residential development have facilitated access to affordable home ownership and what lessons can be derived from these experiences.
- Part III provides a general description of the Pro-Home concept, illustrating its key features and design elements.
- Part IV presents a detailed application scenario of the Pro-Home approach to housing development, including a cost proforma and analysis of possible constraints to implementation.
- Part V proposes an implementation framework for incremental housing development, focusing on organizational elements such as partnerships, an organizational model and an implementation process.

*Prepared by John van Nostrand of Planning Alliance with the assistance of Jill Wigle. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program) vii, 65 pages.*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### PROJECT TO ENCOURAGE TRIPLEX AND QUADRUPLEX HOUSING, CITY OF NANAIMO, BRITISH COLUMBIA = PROJET VISANT À ENCOURAGER LES TRIPLEX ET QUADRUPLEX, VILLE DE NANAIMO (COLOMBIE-BRITANNIQUE)

This case study report describes the work of the City of Nanaimo to expand the opportunities for its growing numbers of lower to moderate income seniors, empty nesters and first time buyers to access affordable housing through the creation of well designed triplex and quadruplex projects. Community representatives, the Nanaimo Home Builders' Association and the Nanaimo Chapter of the Vancouver Island Architects Association participated in this project to provide an alternate form of housing that would fit in with traditional neighbourhoods. The objectives of the project were to:

- bring stakeholders in the housing sector together to design three innovative triplex and quadruplex housing forms;
- prepare design guidelines for the development of attractive, affordable, triplex and quadruplex housing; and
- adopt appropriate changes to the Official Community Plan, Zoning Bylaw, Subdivision Guidelines and Multi-family Development Permit Guidelines to allow for this type of housing within single family neighbourhoods.

## RESIDENTIAL DEVELOPMENT

Case study written by: Rowena E. Moyes. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1998. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 48 pages

Order Number: 61996

**STATUS** : New Completed Report

**AVAILABILITY** : CMHC Information Products

### SUSTAINABLE MUNICIPAL INFRASTRUCTURE DESIGN FOR A RESIDENTIAL DEVELOPMENT

This project's objectives are to review current practices pertaining to suburban communities in Southern Ontario, Canada and in other parts of the world; consider alternative design options for subdivisions and provide practical and up-to-date recommendations for the incorporation of more newly available products and processes to improve the design of residential developments. The alternative design options will be evaluated for energy efficiency and resource conservation.

**CMHC Project Officer** : Susan Fisher

**CIDN** : 2144 0200021

**Division** : Research Division

**STATUS** : Planned

**AVAILABILITY** : Publication is not available

## SENIORS

### EVALUATION OF OPTIMAL BATH GRAB BAR PLACEMENT FOR SENIORS

This project's objective is to assess different locations and configurations of bathtub grab bars and to identify the safest and most useful options to help independent seniors living in the home to maintain their independence and avoid falls.

**CMHC Project Officer** : Luis Rodriguez

**CIDN** : 2305 0200021

**Division** : External Research Program

**STATUS** : New Project

**AVAILABILITY** : Publication is not available

### HOUSING OPTIONS FOR OLDER CANADIANS: USER SATISFACTION STUDY

The objective of this research was to carry out user satisfaction studies of some of the newer housing options that are currently available to older Canadians, and to produce an objective and detailed report based on the results of the research.

The research included 24 case studies of housing options for older Canadians from across the country. During site visits to each of these housing options, focus groups were held with key stakeholders involved in establishing and operating the projects (planners, managers, owners, service-providers, etc.), a sample of residents participated in "walk and talk" evaluations of their dwelling units, and study staff completed an architectural checklist. Additionally, photos, architectural drawings, brochures and policy manuals were collected from each of the 24 sites and a resident satisfaction survey was distributed.

The report is published in 3 parts:

Part 1 presents the findings from the 24 case studies that were carried out, emphasizing the projects' design characteristics and development process, as well as the residents' level of satisfaction with their housing. The results are grouped under six categories of housing.

Part 2 presents detailed findings from the Resident Satisfaction Survey that was carried out. These are discussed under the following nine headings: Respondent Characteristics, Personal Housing History, Current Housing, Satisfaction with Housing Features, Satisfaction with Tenure Arrangement, Satisfaction with Social Involvement and Interaction, Satisfaction with Management and Operational Approaches, Satisfaction with Support Services and Amenities and Overall Satisfaction with Housing Project.

Part 3 contains the frequency tables from which the data in Parts 1 and 2 reports derived, as well as the various forms, checklists, and research and survey tools that were used to carry out the study.

*Prepared by Gloria Gutman, Mary Ann Clarke Scott and Nancy Gnaedinger in collaboration with Danielle Maltais, Luba Serge and David Bruce. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Luis Rodriguez. Ottawa: CMHC, 2001. 3 volumes.*

NOTE : No. 83 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## **IMPROVING QUALITY OF LIFE IN BOARDING HOUSES FOR THE ELDERLY: REGROUPEMENT DES RÉSIDENCES POUR RETRAITÉS DU QUÉBEC, MONTRÉAL, QUÉBEC = AMÉLIORATION DE LA QUALITÉ DE VIE DANS LES RÉSIDENCES POUR PERSONNES ÂGÉES : REGROUPEMENT DES RÉSIDENCES POUR RETRAITÉS DU QUÉBEC, MONTRÉAL, QUÉBEC**

In Quebec, as elsewhere in Canada, the growing number of seniors combined with a serious lack of housing has led to the proliferation of small, privately-run residences providing room and board to elderly persons. In many cases, these homes operate without a permit and therefore, without adequate regulatory control over the quality of the accommodation or services provided.

In response to this situation, in December 1993, the City of Châteauguay amended its bylaw to ensure that homes providing room and board to more than two persons meet minimum standards of health and safety. Inspired by the Châteauguay example, the Regroupement des résidences pour retraités du Québec (RRRQ), a provincial organization of seniors' residences, undertook an A\*C\*T initiative to develop a set of regulatory tools intended for use by Quebec municipalities wishing to improve the quality of life in small boarding houses for elderly people.

This case study report describes the work done in reviewing existing regulatory initiatives in Châteauguay as well as in Laval and Longueuil, which led to the identification of three approaches to improving living conditions in small boarding houses:

- a model bylaw that applies to boarding houses containing fewer than ten rooms for rent;
- a municipal registry of homes that comply with the bylaw; and
- the creation of an ongoing dialogue between the key players, such as the municipality and a CLSC.



## SENIORS

Case study written by: Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999. (Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project; ACT Case Study)

Order Number: 61998

**STATUS** : New Completed Report

**AVAILABILITY** : CMHC Information Products

### SÉCURITÉ EN CAS D'INCENDIE : PERSONNES À MOBILITÉ RÉDUITE VIVANT EN MILIEU RÉSIDENTIEL RÉGULIER

The primary objective of the project was to identify measures that could increase the level of fire safety for persons with disabilities living in regular residential buildings.

The project concluded that owners of regular residential buildings must become aware of the situation of persons with disabilities who live in their buildings and that they must establish a fire safety plan (FSP) with evacuation strategies that take into account the architectural characteristics of the building, the characteristics and evacuation capacities of the occupants and the intervention capability of the local fire department. The report also provides advice to help owners establish a fire safety plan for their buildings.

Prepared by Sophie Lanctôt, Société Logique inc. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program) 121 pages.

**STATUS** : New Completed Report

**AVAILABILITY** : Canadian Housing Information Centre

### STUDY OF SPATIAL ORIENTATION IN A RESIDENTIAL COMPLEX FOR SENIORS WITH OR WITHOUT COGNITIVE DISORDERS

The general purpose of this research project is to obtain spatial orientation design criteria that will make it possible to work on the architectural environment of residential complexes for seniors. The analysis concerns three typical residential complexes.

**CMHC Project Officer** : Luis Rodriguez

**CIDN** : 2144 0200017

**Division** : Research Division

**STATUS** : Ongoing Project

**AVAILABILITY** : Publication is not available

## SOCIAL HOUSING

### TAKING ANOTHER LOOK AT MIXED INCOME COMMUNITIES: WHO ARE THE MARKET TENANTS LIVING IN SOCIAL HOUSING (ERP)

This research study will focus on the Greater Vancouver area to determine the extent to which similar characteristics exist among market renters living in units built under the Province of BC Homes BC program.

**CMHC Project Officer** : William Lortie

**CIDN** : 2305 020001

**Division** : External Research Program

**STATUS** : Planned

**AVAILABILITY** : Publication is not available

## ARDENCRAIG: DOCUMENTATION OF AN URBAN INFILL AND REMODEL PROJECT WITH SUSTAINABILITY ELEMENTS

This research will document an urban infill and renovation project in Vancouver by a developer who is highly motivated to produce an innovative project with a sustainability emphasis. The design and construction process will be followed closely, illustrating each item considered, and highlighting the practicality, cost, technical and market acceptance issues around each decision. This will be reported as a 'story line' with summary text and photos. When the project is built, visitors and prospective occupants will be surveyed on their reaction to the innovative features.

**CMHC Project Officer :** Brian Eames

**CIDN :** 2305 0200010

**Division :** External Research Program

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## CMHC CONTRIBUTION TO THE SUSTAINABLE COMMUNITY DEMONSTRATION IN SURREY B.C.

This study will document the planning of an innovative, sustainable community in an emerging urban area of Surrey, B.C, called East Clayton. It will show and describe the Neighbourhood Concept Plan (NCP) for this site, and outline the benefits of this plan over a more conventional neighbourhood design. It will also describe the process of consultation, design and planning of the NCP.

**CMHC Project Officer :** Susan Fisher

**CIDN :** 2219 0200001

**Division :** Research Division

**STATUS :** Ongoing Project

**AVAILABILITY :** Publication is not available

## FROM THEORY TO PRACTICE: A REVIEW OF PERFORMANCE ASSESSMENT CRITERIA FOR IMPLEMENTING SUSTAINABLE COMMUNITIES

The purpose of this project is to identify and briefly describe a number of performance assessment criteria that are currently being used to operationalize the principles/features/objectives of sustainable community development from Canada, the US and Europe, etc.

**CMHC Project Officer :** Doug Pollard

**CIDN :** 2305 0200012

**Division :** External Research Program

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## IMPACT OF HOUSING CHOICES: CONSUMER INFORMATION ON SUSTAINABLE COMMUNITY PLANNING

The purpose of this project is to develop a consumer-oriented information product comparing the impact of various housing choice scenarios, each with different community planning patterns.

**CMHC Project Officer :** Susan Fisher

**CIDN :** 2280 0200001

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

## LANDSCAPE DESIGN AND MAINTENANCE FOR CANADIAN HOMES

The purpose is to develop an updated advisory document on landscape design, construction and maintenance for Canadian homes. CMHC's last advisory document of this nature, entitled *Landscape Architectural Design and Maintenance*, was published in 1982. While it offers many practical tips and tools which should be emulated, the update will be more oriented toward a consumer-audience, place more emphasis on sustainability and build on recent CMHC research in this area. The document will be completed in 2001 and will be of interest to consumers, landscape architects and the landscape industry.

**CMHC Project Officer :** Susan Fisher

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2229 0200001

**STATUS :** Ongoing Project

## MULTIPLE HOUSING FOR COMMUNITY SUSTAINABILITY

To design and build sustainable communities, professionals in the housing industry need to be familiar with the features of sustainability and their potential appeal to the consumer. This report focuses on the factors that make medium density housing sustainable and appealing to certain segments of the market. It provides a detailed account of consumer requirements for medium density housing and gives examples, both existing and new, of how these can be satisfied. It describes clearly which households are likely to choose medium density forms and how to appeal to them with specific features and marketing tactics. A wealth of illustrations make these features clear and connects them to expressed consumer expectations.

This study will become a valuable reference of ideas for developers or planners that seek to intensify land use in cities. The rich material in the report enables developers and municipalities to base the case for medium density housing firmly in consumer preferences and market demand. It gives the ground rules for satisfying consumer expectations and a range of models with which to do it. It promotes greater acceptance of medium density housing and that enable communities to become more sustainable.

*Prepared by Quadrangle Architects Limited, Urban Research Associates, Alen Kani Associates, David Redmond and Associates. Prepared for Research Division, Canada Mortgage and Housing Corporation and Natural Resources Canada, Regional Municipality of Ottawa-Carleton. CMHC Project Officer: Fanis Grammenos. Ottawa: CMHC, c2000. (Housing Affordability and Finance Series Research Report) iv, 53 pages*

Order number: 62148

NOTE : Aussi disponible en français sous le titre : Logement collectif et la collectivité durable

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## PARTICIPATION METHODOLOGY TO GENERATE SUSTAINABLE URBAN COMMUNITY PLANNING

This project's objective is to develop a user participation methodology to generate sustainable urban community planning.

**CMHC Project Officer :** Doug Pollard

**Division :** Research Division

**AVAILABILITY :** Publication is not available

**CIDN :** 2308 0200001

**STATUS :** New Project



### TESTING CONSUMER RECEPTIVITY TO SUSTAINABLE COMMUNITY DESIGN FOR A DEMONSTRATION -BUILD SITE IN OKOTOKS, ALBERTA

CMHC contribution to develop a computer-based visualization tool that will illustrate and describe the features of a 144-acre demonstration project that adopts sustainable community principles and planning criteria.

**CMHC Project Officer :** Susan Fisher

**CIDN :** 2363 0200001

**Division :** Research Division

**STATUS :** New Project

**AVAILABILITY :** Publication is not available

### YOUR NEXT MOVE: CHOOSING A NEIGHBOURHOOD WITH SUSTAINABLE FEATURES

If you are considering a move, this guide will help you identify neighbourhood features that benefit you and the environment. You will learn about the features, like close access to shopping and jobs as well as see examples from real neighbourhoods across Canada. When searching for your next home, use the checklist to compare neighbourhoods.

Ottawa: Canada Mortgage and Housing Corporation, 2001. 8 pages

Order Number: 62180

Note: Aussi disponible en français sous le titre : Lors de votre prochain déménagement : choisissez un quartier comportant des caractéristiques durables

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

Note: Also available on the Internet:

[http://www.cmhc-schl.gc.ca/en/bureho/buho/buho\\_003.cfm](http://www.cmhc-schl.gc.ca/en/bureho/buho/buho_003.cfm)

## URBAN TRANSPORTATION

### GREENHOUSE GAS EMISSIONS FROM URBAN TRAVEL: TOOL FOR EVALUATING NEIGHBOURHOOD SUSTAINABILITY

The purpose of this study is to develop a tool that calculates greenhouse gas (GHG) emissions from personal urban transportation (i.e. cars and public transit) given variations in neighbourhood planning and design variables such as density and land use mix, as well as demographic and locational variables. The Research Report includes a software tool that can be used to evaluate neighbourhood development proposals for GHG emissions from urban travel. In the study, the software is used to compare the GHGs from urban travel of nine neighbourhood scenarios, each with different design features and locational variables.

The results of the evaluation of the nine neighbourhood scenarios using the model developed in this study suggest that the "macro" urban structure is more important than the "micro" neighbourhood design in reducing GHG emissions from auto and transit travel by neighbourhood residents. That is, infill development is more effective than greenfield development in moderating the growth of GHG emissions, even if the new greenfield neighbourhood is neo-traditional rather than typical suburban in design. However, neighbourhood design is also a significant determinant of GHG emissions and can go a long way in improving the sustainability of neighbourhoods in the outer regions of urban areas.

## URBAN TRANSPORTATION

The spreadsheet tool produced by this study provides a useful instrument for planners and developers in comparing the GHG emissions of different neighbourhood scenarios. It enables them to compare the implications of both local neighbourhood design and the broader-scale urban structure considerations of infill versus greenfield development.

*Prepared by IBI Group for Canada Mortgage and Housing Corporation and Natural Resources Canada. CMHC Project Officer: Susan Fisher. Ottawa: CMHC, 2000. (Healthy Housing and Communities Series) ix, 60 pages.*

Order Number: 62142

NOTE : Aussi disponible en français sous le titre : Émissions de gaz à effet de serre attribuables aux déplacements urbains (PF 0432)

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

## REGIONAL ROAD CORRIDOR DESIGN GUIDELINES. SOCIO-ECONOMIC RESEARCH HIGHLIGHT; NO. 52

This document addresses the function and design of regional arterial roads and adjacent lands in the urban areas and villages of the former Region of Ottawa-Carleton (now the City of Ottawa). It provides design guidelines that integrate traditional objectives like safety and efficiency of vehicular movement with safe, pleasant and convenient movement of pedestrians, cyclists, and transit users. The document crosses traditional boundaries between land use and transportation planning by including the road right-of-way (ROW) and its interface with adjacent land uses, right up to building facades. While the guidelines were developed specifically by the former Region of Ottawa-Carleton, they could also apply to similar municipalities across Canada.

Ottawa: Canada Mortgage and Housing Corporation, 2001. 6 pages

NOTE : Aussi disponible en français sous le titre : Lignes directrices en matière de conception des corridors de routes régionales. Point en recherche : série socio-économique; no. 52

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre and available on the Internet at: [http://www.cmhc-schl.gc.ca/publications/en/rh-pr/main\\_en.html](http://www.cmhc-schl.gc.ca/publications/en/rh-pr/main_en.html)

## YOUTH AND HOUSING

### INNOVATIVE HOUSING FOR HOMELESS YOUTH

The purpose of this project is to research and identify the innovative aspects of housing for homeless youth in terms of architecture, management and support services and to identify what makes a project exceptional and successful.

**CMHC Project Officer :** Anna Lenk

**Division :** External Research Program

**AVAILABILITY :** Publication is not available

**CIDN :** 2305 0200001

**STATUS :** Ongoing Project

### RESIDENTIAL INTEGRATION OF YOUNG MIGRANTS IN QUEBEC

This study concerns the residential integration process of young migrants in Quebec. Residential integration is defined as a process that begins even before young people leave their parents' home and that continues until they are relatively stable in a dwelling; this stability often, but not necessarily, corresponds to the formation of a family unit.

**CMHC Project Officer :** Leanne Elliott

**Division :** External Research Program

**AVAILABILITY :** Publication is not available

**CIDN :** 2305 0200005

**STATUS :** New Project





- Adjustable Rate Mortgages / Prêts hypothécaires à taux flottant  
(Rev. 18p., October/octobre 1991)
- Building in cold climates / Construction dans les pays froids  
(Rev. 9p., December/décembre 1989)
- Children in the urban environment / Les enfants dans le milieu urbain  
(23 p., January/janvier 1993)
- CMHC Scholarship Program: A Bibliography 1947 - 1993 / Le Programme de bourses d'études de la SCHL : une bibliographie 1947 - 1993  
(66 p., 1994)
- Cohousing / Habitation communautaire  
(8p., July/juillet 1996)
- Congregate housing / Habitat collectif  
(10 p., November/novembre 1991)
- Construction industry in Canada / Industrie de la construction au Canada  
(Rev. 27 p., January/janvier 1988)
- Cooperative housing / Coopératives de logements  
(Rev. 40 p., September/septembre 1988)
- Crime prevention and architectural design / Design architectural et prévention de la criminalité  
(7 p., May/mai 1989)
- Crime prevention and urban safety in residential environments / La prévention du crime et la sécurité dans les milieux résidentiels urbains  
(12p., September/septembre 1989)
- Discrimination and segregation in housing in Canada / Bibliographie sur la discrimination et la ségrégation dans le logement au Canada  
(5p., March/mars 1993)
- Downtown redevelopment / Réaménagement de centres-villes  
(Rev. 26p., January/janvier 1989)
- Earthquakes and construction / Tremblements de terre et construction  
(20 p., March/mars 1995)
- External Research Program Reports arranged by subject / Rapports du programme de recherche à l'extérieur par sujet  
(Rev. 70 p., November/novembre 2000)
- Floating Homes and Houseboats / Maisons-bateaux et Bateaux-maisons  
(15 p., August/août 1997)
- Foundations / Fondations  
(17p., January/janvier 1989)
- Graduated payment mortgages / Prêts hypothécaires à paiements progressifs  
(Rev.3p., October/octobre 1991)
- Home equity conversion / Conversion de la valeur nette du logement  
(9p., October/octobre 1988)
- Home ownership / La propriété d'un logement  
(Rev. 28p., August/août 1987)

- Homelessness / Sans-logis  
(Rev. 61 p., June/juin 1998)
- Housing and AIDS / Hébergement des personnes atteintes du SIDA  
(5 p., September/septembre 1993)
- Housing and services for the disabled / Logement et les services pour les handicapés  
(Rev. 68 p., April/avril 1992)
- Housing conversion and residential intensification / Conversion d'habitations et intensification résidentielle  
(Rev. 8 p., October/octobre 1990)
- Housing demand / La demande en logement  
(22 p., November/novembre 1986)
- Housing for immigrants and minorities / Logement pour les groupes ethniques et immigrants  
(7 p., May/mai 1993)
- Housing for single people / Le logement et les personnes seules  
(7 p., October/octobre 1992)
- Housing in Canadian municipalities / Logement dans les municipalités canadiennes  
(Rev. 44 p., March/mars 1985)
- Housing in urban core areas / Logement dans les centres-villes  
(Rev. 13 p., January/janvier 1985)
- Housing management / Gestion des logements  
(Rev. 23 p., January/janvier 1989)
- Housing markets / Le marché du logement  
(Rev. 36 p., January/janvier 1988)
- Housing policy in Canada / Politique du logement au Canada  
(Rev. 45 p., January/janvier 1987)
- Housing quality / Qualité de logement  
(8 p., January/janvier 1988)
- Housing renovation / Restauration de quartiers résidentiels  
(Rev. 62 p., March/mars 1988)
- Housing subsidies / Subventions au logement  
(Rev. 49 p., October/octobre 1990)
- Impact of inflation on house prices / Effets de l'inflation sur le prix des maisons  
(Rev. 5 p., February/février 1995)
- Indoor air pollution / Pollution de l'air des habitations  
(Rev. 29 p., July/juillet 1990)
- Infill housing / Logement résidentiel complémentaire  
(Rev. 8 p., March/mars 1990)
- Insulation / Isolement  
(Rev. 33 p., November/novembre 1991)
- Land banks and land trusts / Banques agraires et sociétés foncières  
(15 p., November/novembre 1990)



- Life cycle costing / Estimations du coût global  
(Rev. 9 p., November/novembre 1992)
- Lofts / Lofts  
(6 p., July/juillet 1996)
- Log structures / Constructions en pièce sur pièce  
(Rev. 8 p., April/avril 1989)
- Low cost affordable housing / Habitation à coût modique  
(Rev. 35 p., October/octobre 1989)
- Manufactured housing / Habitation préfabriquée  
(Rev. 33 p., November/novembre 1986)
- Moisture problems in buildings / Humidité dans les constructions  
(Rev. 21 p., July/juillet 1990)
- Mortgage-backed securities / Titres hypothécaires  
(13 p., March/mars 1988)
- Mortgage insurance / L'assurance hypothécaire  
(11 p., April/avril 1988)
- Mortgages / Hypothèques  
(Rev. 21 p., August/août 1984)
- Native housing / Logement pour autochtones  
(42 p., January/janvier 1996)
- Noise / Le bruit  
(30 p., December/décembre 1991)
- Non-profit housing / Le logement à but non-lucratif  
(Rev. 19 p., October/octobre 1989)
- Playgrounds / Terrains de jeux  
(Rev. 30 p., December/décembre 1991)
- Post occupancy evaluation / Évaluation après occupation  
(13 p., February/février 1989)
- Public housing in Canada / Habitations à loyer modéré au Canada  
(Rev. 63p., September/septembre 1991)
- Public housing in Great Britain / Habitations à loyer modéré au Grande-Bretagne  
(17p., September/septembre 1988)
- Public/Private Partnerships / Association du secteur public et du secteur privé  
(13 p., December/décembre 1989)
- Radon and houses / Radon dans les habitations  
(Rev. 23 p., July/juillet 1990)
- Real estate in Canada / Propriété immobilière au Canada  
(Rev. 37 p., September/septembre 1987)
- Rent control / Contrôle des loyers  
(Rev. 20 p., August/août 1990)
- Rental housing / Logement locatif  
(53 p., October/octobre 1990)

Residential development / Développement résidentiel

(Rev. 57 p., July/juillet 1991)

Residential displacement, relocation, and gentrification / Relogement, relocalisation, et embourgeoisement

(19 p., September/septembre 1988)

Residential Rehabilitation Assistance Program / Programme d'aide à la remise en état des logements

(8 p., February/février 1988)

Resource communities / Villes d'exploitation de ressources

(Rev. 15 p., March/mars 1988)

Retirement and life care communities / Collectivités de retraités et communautés fournissant des soins à vie

(Rev. 10 p., March/mars 1990)

Rural housing / Logement rural

(Rev. 18 p., March/mars 1988)

Secondary mortgage markets / Marchés hypothécaires secondaires

(6 p., August/août 1982)

Self-help housing / Autoconstruction

(Rev. 13 p., January/janvier 1989)

Seniors housing / Le logement et les personnes âgées

(Rev. 146 p., October/octobre 2000)

Shared housing / Logement à contrepartie de travaux

(Rev. 11 p., October/octobre 1994)

Solar access rights / Droit au soleil

(Rev. 8 p., October/octobre 1992)

Solar heating / Chauffage solaire

(Rev. 16 p., October/octobre 1992)

Solar houses / Maisons solaires

(Rev. 22 p., October/octobre 1992)

Stackwall and cordwood house construction / Construction de maisons de «bois cordé»

(Rev. 2 p., December/décembre 1992)

Straw bale housing / Maisons de ballots de paille et mortier

(Rev. 10 p., January/janvier 1998)

Student housing / Logement pour les étudiants

(Rev. 6 p., July/juillet 1989)

Temporary shelter for battered women / L'hébergement temporaire pour les femmes victimes de violence

(Rev. 11 p., May/mai 1991)

Total Quality Management/Qualité totale

(17p., July/juillet 1996)

Underground housing / Maisons souterraines

(Rev. 31 p., October/octobre 1992)

Urban Infrastructure in Canada / L'infrastructure urbaine au Canada

(62 p., April/avril 1989)

Vacation homes / Chalets

(29 p., November/novembre 1991)

Variable-rate mortgages / Les prêts hypothécaires à taux variable

(Rev. 9p., October/octobre 1991)

Ventilation / Ventilation

(Rev. 26 p., September/septembre 1991)

Wind pressure and buildings / Les pressions exercées par le vent sur les bâtiments

(Rev. 13 p., November/novembre 1990)

Women and housing / Les femmes et le logement

(15 p., April/avril 1991)

Wood construction / Construction en bois

(Rev. 21 p., August/août 1987)

Youth and Housing / Les jeunes et le logement

(20 p., November/novembre 1998)





## TITLE INDEX

- ABOUT YOUR HOUSE PUBLICATION ON UNDERSTANDING AND DEALING WITH INTERACTIONS BETWEEN TREES, SENSITIVE CLAY SOILS AND FOUNDATIONS, 16
- ACT REGIONAL STAKEHOLDER INFORMATION SESSIONS, 82
- ACTION PLAN FOR REDUCING GREENHOUSE GASES IN RURAL COMMUNITIES, 62
- ACTION PLAN FOR REVITALIZING A COMMERCIAL ARTERY: COLLECTIF EN AMÉNAGEMENT URBAIN HOCHELAGA-MAISONNEUVE, MONTRÉAL, QUÉBEC = PLAN D'ACTION POUR LA RVITALISATION D'UNE ARTÈRE COMMERCIALE : COLLECTIF EN AMÉNAGEMENT URBAIN HOCHELAGA-MAISONNEUVE, MONTRÉAL, QUÉBEC, 94
- AFFORDABLE HOUSING ADVISOR, 82
- AIR LEAKAGE CHARACTERISTICS, TEST METHODS AND SPECIFICATIONS FOR LARGE BUILDINGS, 23
- ALTERNATE ABORIGINAL TRAINING DELIVERY OPTIONS, 70
- ALTERNATIVE HOME ENERGY SOURCES FOR THE NORTH, 23
- ALTERNATIVE WALL SYSTEMS FOR LOW-RISE RESIDENTIAL CONSTRUCTION, 45
- ANALYSIS OF PENSION AND RRSP INVESTMENTS IN CANADIAN RENTAL HOUSING, 99
- ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS, 24
- APPLICABILITY OF A CONTINUUM OF CARE MODEL TO ADDRESS HOMELESSNESS, 76
- ARDENCRAIG: DOCUMENTATION OF AN URBAN INFILL AND REMODEL PROJECT WITH SUSTAINABILITY ELEMENTS, 107
- ASSESSING THE FULL COSTS OF WATER, LIQUID WASTE, ENERGY AND SOLID WASTE INFRASTRUCTURE IN THE FRASER VALLEY REGIONAL DISTRICT, 72
- ASSESSING THE PARAMETERS FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS, 28
- ASSESSMENT OF PREFABRICATED BUILDING SYSTEMS INDUSTRY, 85
- ASSESSMENT REPORT ON RENTAL HOUSING TAXATION IN CANADA, 100
- AUSTRALIAN BUILDING REGULATION AND LIABILITY REFORMS: AN UPDATE, 59
- BC MOISTURE PROBLEMS - ENVELOPE DRYING RATES EXPERIMENT, 31
- BEST PRACTICE GUIDE - FIRE AND SOUND ASSEMBLIES FOR MULTI-FAMILY BUILDINGS, 31
- BEST PRACTICE GUIDE - WOOD FRAME ENVELOPES IN COASTAL CLIMATES OF BRITISH COLUMBIA, 31
- BEST PRACTICE GUIDE FOR CURTAIN WALLS, 32
- BEST PRACTICE GUIDE FOR EXTERIOR INSULATED FINISHED SYSTEMS (EIFS), 32
- BEST PRACTICE GUIDE FOR PRE-CAST CONCRETE WALLS, 21
- BEST PRACTICE GUIDE FOR THE EVALUATION, REPAIR AND MAINTENANCE OF PARKING GARAGES, 21
- BETTER BUILDING GUIDE TO INNOVATION IN THE DESIGN AND CONSTRUCTION OF HIGH-RISE RESIDENTIAL BUILDINGS, 32

BREEAM GREEN LEAF ECO-RATING PROGRAM: CMHC MULTI-RESIDENTIAL BUILDINGS ASSESSMENT PILOT: FINAL REPORT, 33

BRINGING COMPUTERS INTO THE PERMITTING PROCESS, STRATHCONA COUNTY, ALBERTA = AUTOMATISATION DU PROCESSUS D'ÉMISSION DE PERMIS, STRATHCONA COUNTY (ALBERTA), 94

BRITISH COLUMBIA HIGH-RISE ENVELOPE DETAILS STUDY, 33

BUILDING ENVELOPE TEST HUT IN VANCOUVER B.C.- FEASIBILITY STUDY, 34

BUILDING FAILURES UPDATE 2000 - HIGH-RISE CONDOMINIUMS STUDIES, 34

CANADA POLAND RESIDENTIAL REAL ESTATE INVESTMENT MODEL: AN EVALUATION OF POLAND'S RESIDENTIAL REAL ESTATE MARKET: SUMMARY, 85

CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS - STEERING COMMITTEE FOR NATIONAL OCCUPATIONAL STANDARDS, 59

CANADIAN HOMES AND CLIMATE CHANGE, 62

CANADIAN HOUSING EXPORTERS IN THE KOREAN HOUSING MARKET, 86

CASE STUDIES OF MAJOR HOME ENERGY RETROFITS, 24

CASE STUDIES OF WATER CONSERVATION INITIATIVES IN MULTIS, 65

CASE STUDY OF A SUCCESSFUL INNOVATIVE MULTI-UNIT RESIDENTIAL BUILDING: A COMPENDIUM OF RESEARCH OF THE CONSERVATION CO-OP BUILDING, 34

CD-ROM VERSION OF THE CANADIAN WOOD-FRAME HOUSE CONSTRUCTION, 46

CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS, 28

CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA, 35

CHILDREN AND YOUTH IN HOMELESS FAMILIES: SHELTER SPACES AND SERVICES, 76

CLEANING UP YOUR HOUSE AFTER A FIRE, 27

CMHC CONTRIBUTION TO THE SUSTAINABLE COMMUNITY DEMONSTRATION IN SURREY B.C., 107

CMHC GARBAGE BAG AIRFLOW TEST. ABOUT YOUR HOUSE; CE33, 28

COCHRANE, ALBERTA, COMMUNITY-BASED AFFORDABLE HOUSING INITIATIVE, PLANNING AND ENGINEERING SERVICES DEPARTMENT, TOWN OF COCHRANE, ALBERTA = INITIATIVE DE LOGEMENTS À PRIX ABORDABLE DE LA VILLE DE COCHRANE (ALBERTA), SERVICE DE L'URBANISME ET DU GÉNIE, VILLE DE COCHRANE (ALBERTA), 82

COMMUNICATIONS & INFORMATION TRANSFER STRATEGY FOR ABORIGINAL GROUPS, 70

COMMUNITY DESIGN: AN ANALYSIS OF DENSITY MEANINGS AND DEVELOPMENT OF A DESIGN TOOL, 102

COMPARING THE PERFORMANCE OF TWO-COAT VS THREE-COAT STUCCO, 47

COMPARISON OF NORTHERN HOUSING COSTS, 56

COMPREHENSIVE STUDY ON SLAB-ON-GRADE FOUNDATIONS, 17

CONDITION SURVEY OF CONDOMINIUMS IN THE GREATER TORONTO AREA (GTA), 35



CONSTRUCTION RESOURCE MANAGEMENT COURSE - PHASE II, 62

CONTRACT MANAGEMENT COURSE FOR RESIDENTIAL PROPERTY MANAGERS AND BUILDING OWNERS, 58

CONTRACTOR TRAINING COURSE ON THE CONSTRUCTION AND RESTORATION OF DURABLE BUILDING ENVELOPES FOR RESIDENTIAL WOOD-FRAME BUILDINGS LOCATED IN THE LOWER MAINLAND OF BC AND VANCOUVER ISLAND, 47

CONTRIBUTION TO A STUDY ON PACIFIC RIM MARKETS FOR TERMITE-RESISTANT WOOD PRODUCTS, 86

CONVERSION OF HIGH-RISE BUILDINGS TO RESIDENTIAL USE, 36

CONVERSION OF NON-RESIDENTIAL BUILDINGS TO MULTI-RESIDENTIAL USE, 36

COST-EFFECTIVE INDOOR AIR QUALITY AND ENERGY EFFICIENCY RECOMMENDATIONS FOR FIRST NATIONS HOUSING, 15

CRISIS SITUATIONS IN COOPERATIVES: INCREASING UNDERSTANDING TO IMPROVE INTERVENTION, 74

DAWSON CITY DEMONSTRATION PROJECT - MONITORING, 29

DEMOGRAPHIC CHANGES AND REAL HOUSING PRICES IN CANADA, 90

DEMONSTRATION OF SAFE HOUSING ON LIGHTLY CONTAMINATED LANDS, 22

DEVELOP A SET OF ENVIRONMENTALLY SUSTAINABLE SITE AND BUILDING DESIGN, CONSTRUCTION AND OPERATION GUIDELINES FOR SINGLE AND MULTI-FAMILY UNIT HOUSING, MOTELS AND HOTELS FOR THE TOWN OF BANFF, 63

DEVELOPMENT OF A GUIDE TO THE UNITED KINGDOM BUILDING REGULATIONS, 86

DEVELOPMENT OF A PROCEDURE FOR ESTIMATING AIR CHANGE RATES USING A SPECIFIC ODOUR AS A TRACER GAS, 49

DEVELOPMENT OF A TEACHING MODULE ON INDOOR AIR QUALITY FOR PHYSICIANS, 50

DEVELOPMENT OF AN EXPORT TOOL-KIT FOR CHINA, 86

DISINVESTMENT AND THE DECLINE OF URBAN NEIGHBORHOODS, 99

DUAL FLUSH TOILET PILOT PROJECT, 65

ECONOMIC FEASIBILITY STUDY OF WATER REUSE AND TREATMENT TECHNOLOGIES, 66

EFFECTS OF DEVELOPMENT CHARGES ON URBAN FORM, 102

EFFECTS OF URBAN ABORIGINAL RESIDENTIAL MOBILITY AND SERVICE PROVISION, 71

ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS, 24

ENERGY EFFICIENCY OPPORTUNITIES MANUAL FOR MULTI-UNIT RESIDENTIAL BUILDINGS, 25

ENERGY USE PATTERNS OF OFF-GRID HOUSES, 25

ENVIRONMENTAL SCAN: YOUTH HOMELESSNESS, 77

EVALUATION OF OPTIMAL BATH GRAB BAR PLACEMENT FOR SENIORS, 104

EVALUATION OF THE PHYSICAL REQUIREMENTS TO GO UP ACCESS RAMPS IN MANUAL WHEEL CHAIRS AMONG ADULTS AND SENIORS, 92

EVOLVING IMPACT OF E-COMMERCE ON HOUSING FINANCE ACCESS AND AFFORDABILITY: US EXPERIENCE AND LESSONS FOR CANADA, 91

EXAMINATION OF THE HOUSING CHOICES OF PERSONS WITH DISABILITIES, 92

EXPERIENCES OF MOTHERS WHO USE WHEELCHAIRS IN HOMEMAKING AND CHILD CARE, 92

FEASIBILITY OF UTILIZING A PORTABLE HOUSING PLANT FOR SINGLE FAMILY DETACHED CONSTRUCTION, 53

FEASIBILITY STUDY FOR A HERITAGE RENOVATION ASSISTANCE SERVICE, LAC-SAINT-JEAN HISTORICAL SOCIETY, ALMA, QUEBEC = ÉTUDE DE FAISABILITÉ SUR UN SERVICE D'AIDE À LA RÉNOVATION PATRIMONIALE, SOCIÉTÉ D'HISTOIRE DU LAC-SAINT-JEAN, ALMA (QUÉBEC), 60

FEASIBILITY STUDY ON THE DEVELOPMENT OF A COMMISSIONING GUIDE FOR NEW HOUSES, 47

FEASIBILITY STUDY ON THE DEVELOPMENT OF A GUIDE FOR ENGINEERED WOOD I-JOIST FLOOR SYSTEMS, 48

FEASIBILITY STUDY ON USING THE PRIVATE HOME INSPECTION INDUSTRY TO COLLECT DATA ON THE PHYSICAL CONDITION OF CANADA'S EXISTING HOUSING STOCK, 60

FINANCIAL TOOLS FOR CO2 REDUCTION, 25

FIRE AND ACOUSTICAL PERFORMANCE OF FLOOR ASSEMBLIES - PHASE II, 36

FIRE SAFETY FOR INFILL CONSTRUCTION SITES, 27

FIRST NATIONS HOUSING PROPERTY MANAGEMENT TRAINING COURSES AND RESOURCES, 71

FROM THEORY TO PRACTICE: A REVIEW OF PERFORMANCE ASSESSMENT CRITERIA FOR IMPLEMENTING SUSTAINABLE COMMUNITIES, 107

GOVERNANCE IN LOCAL PARTNERSHIPS TO ADDRESS HOMELESSNESS, 77

GREENHOUSE GAS EMISSIONS FROM URBAN TRAVEL: TOOL FOR EVALUATING NEIGHBOURHOOD SUSTAINABILITY, 109

GUIDE FOR THE HEALTHY RENOVATION OF A ONE STOREY HOUSE CIRCA 1960-1979, 61

GUIDE TO DEVELOPING A MUNICIPAL AFFORDABLE HOUSING STRATEGY, 83

GUIDELINES FOR MOISTURE MANAGEMENT IN EXTERIOR WALL SYSTEMS, 54

GUIDELINES FOR THE MEASUREMENT OF MOISTURE CONTENT IN FRAMED LUMBER, 54

HEALTHY INDOOR ENVIRONMENTS PHASE 2: CONSULTATION PROCESS, 50

HIGH-RISE RENTAL RETROFIT COSTS AND IMPACTS, 37

HOMELESS INDIVIDUALS AND FAMILIES INFORMATION SYSTEM (HIFIS), 78

HOMEOWNERSHIP EDUCATION AND COUNSELLING: AN EXAMINATION OF U.S. EXPERIENCE AND ITS RELEVANCE FOR CANADA, 75

HOUSING AND BUILDING MARKET IN CHILE, CHINA, GERMANY, JAPAN, KOREA, POLAND, UNITED KINGDOM, 87

HOUSING CANADA'S CHILDREN, 72

HOUSING CHOICE AND ADAPTABILITY FOR AFRICAN REFUGEES: THE CANADIAN AFRICAN NEWCOMER AID CENTRE, TORONTO (ONTARIO) = CHOIX ET ADAPTABILITÉ DES LOGEMENTS DESTINÉS AUX RÉFUGIÉS AFRICAINS : THE CANADIAN AFRICAN NEWCOMER AID CENTRE, TORONTO (ONTARIO), 84

HOUSING CONDITIONS OF PERSONS WITH HEALTH AND ACTIVITY LIMITATIONS IN CANADA, 1991: A RETROSPECTIVE, 92

HOUSING CONSTRUCTION INDUSTRY: CHALLENGES AND OPPORTUNITIES FOR THE 21ST CENTURY, 79

HOUSING IN CANADA (HIC) CD-ROM DATA BASE, 80

HOUSING NEEDS OF LOW-INCOME PEOPLE LIVING IN RURAL AREAS, 78

HOUSING OPTIONS FOR OLDER CANADIANS: USER SATISFACTION STUDY, 104

HOUSING STABILITY AND MENTAL ILLNESS, 78

HOW CAPE BRETON REGIONAL MUNICIPALITY STREAMLINED RESIDENTIAL BUILDING PLANS APPROVALS BY IMPROVING THE QUALITY OF PLANS SUBMITTED FOR REVIEW: FIRE-RESCUE AND BUILDING SERVICES DEPARTMENT OF THE CAPE BRETON REGIONAL MUNICIPALITY, NOVA SCOTIA = COMMENT LA MUNICIPALITÉ RÉGIONALE DU CAP-BRETON A RATIONALISÉ L'APPROBATION DES PLANS DE CONSTRUCTION RÉSIDENTIELLE EN AMÉLIORANT LA QUALITÉ DES PLANS PRÉSENTÉS POUR FINS D'EXAMEN : SERVICES DES INCENDIES ET DU BÂTIMENT DE LA MUNICIPALITÉ RÉGIONALE DU CAP-BRETON, NOUVELLE-ÉCOSSE, 95

HOW THE DISTRICT OF NORTH VANCOUVER BUILT COMMUNITY ACCEPTANCE FOR THE LEGALIZATION OF SECONDARY SUITES IN SINGLE FAMILY NEIGHBOURHOODS = COMMENT LE DISTRICT DE NORTH VANCOUVER EN EST VENU À FAIRE ACCEPTER PAR LA COLLECTIVITÉ LA LÉGISLATION DES APPARTEMENTS ACCESSOIRES DANS LES QUARTIERS CONSTITUÉS DE MAISONS INDIVIDUELLES, 96

IDEAS HIGH-RISE CHALLENGE, 37

IDENTIFICATION OF GAPS IN DISASTER INFORMATION RELATED TO HOUSING, 49

IDENTIFY EXISTING AND EMERGING GREYWATER TREATMENT AND RE-USE TECHNOLOGIES AND TO EXPAND AND REVISE ITS TECHSPEX SOFTWARE TO INCLUDE GREYWATER OPTIONS, 66

IMPACT OF CONVERSIONS OF RENTAL TO OWNERSHIP UNITS ON HOUSING MARKETS IN ONTARIO, 91

IMPACT OF HOUSING CHOICES: CONSUMER INFORMATION ON SUSTAINABLE COMMUNITY PLANNING, 107

IMPLEMENTING SUSTAINABLE COMMUNITY DEVELOPMENT: CHARTING A FEDERAL ROLE FOR THE 21ST CENTURY, 63

IMPLEMENTING THE OUTCOMES OF THE SECOND UNITED NATIONS CONFERENCE ON HUMAN SETTLEMENTS (HABITAT II): CANADA'S RESPONSE = MISE EN OEUVRE DES MESURES ADOPTÉES LORS DE LA DEUXIÈME CONFÉRENCE DES NATIONS UNIES SUR LES ÉTABLISSEMENTS HUMAINS (HABITAT II) : RAPPORT DU CANADA, 73

IMPROVEMENTS TO THE MOISTURE PERFORMANCE OF PRESERVED WOOD FOUNDATIONS, 55

IMPROVING QUALITY OF LIFE IN BOARDING HOUSES FOR THE ELDERLY: REGROUPEMENT DES RÉSIDENCES POUR RETRAITÉS DU QUÉBEC, MONTRÉAL, QUÉBEC = AMÉLIORATION DE LA QUALITÉ DE VIE DANS LES RÉSIDENCES POUR PERSONNES ÂGÉES : REGROUPEMENT DES RÉSIDENCES POUR RETRAITÉS DU QUÉBEC, MONTRÉAL, QUÉBEC, 105



INCREASING HOUSING IN RURAL COMMUNITY CENTRES, BEAUBASSIN PLANNING COMMISSION, CAP-PELÉ, NEW BRUNSWICK = LA DENSIFICATION RÉSIDENTIELLE DANS LES CENTRES COMMUNAUTAIRES RURAUX, COMMISSION D'AMÉNAGEMENT BEAUBASSIN, CAP-PELÉ (NOUVEAU-BRUNSWICK), 97

INDOOR AIR POLLUTION FROM ATTACHED GARAGES, 50

INDOOR AIR QUALITY INVESTIGATION TRAINING, 51

INFORMATION TRANSFER OF HEALTHY HOUSING (HH) TECHNOLOGY IN THE ABORIGINAL CONTEXT, 15

INNOVATIVE FOUNDATIONS, HEATING & VENTILATION, 56

INNOVATIVE HOUSING FOR HOMELESS YOUTH, 110

IN-SITU MONITORING OF EXTERIOR WALL ASSEMBLIES - MONTREUX RESIDENCES, 37

IN-SITU PERFORMANCE OF THE EXTERIOR WALL SYSTEM, 38

INSULATED CONCRETE FORMS TRAINING PROGRAM, 17

INTERGENERATIONAL HOUSING TRENDS AND CHALLENGES, 81

INVESTIGATION AND REPAIR STRATEGIES FOR CONCRETE CONSTRUCTION AND CATALOGUE OF INNOVATIVE CONCRETE ASSESSMENT AND REPAIR TECHNOLOGIES, 21

INVESTIGATION OF CO-VENTURES AND EXPORT POTENTIAL FOR BUILDING PRODUCTS AND MATERIALS RELATED TO SUSTAINABLE DEVELOPMENT IN CHINA, 87

INVESTIGATION OF SMOKE CONTROL IN HIGH-RISES BY POSITIVE PRESSURE VENTILATION, 27

INVESTIGATION PROTOCOL FOR EVALUATION OF POST-TENSIONED BUILDINGS, 38

INVESTMENT IN RESIDENTIAL RENTAL HOUSING IN CANADA: LESSONS LEARNED FROM STUDIES AND RESEARCH, 100

INVOLVING CLIENTS IN ADDRESSING HOMELESSNESS, 79

ISSUES PAPER ON LIABILITY IN HOUSE CONSTRUCTION, 74

LAND USE ISSUES IMPEDING THE PROVISION OF AFFORDABLE HOUSING WITH MOBILE HOMES, 53

LANDSCAPE DESIGN AND MAINTENANCE FOR CANADIAN HOMES, 108

LEAK-PROOFING WINDOWS, PHASE I - FABRICATION, INSTALLATION AND MAINTENANCE, 38

LEAK-PROOFING WINDOWS, PHASE II - A REVIEW OF STANDARDS TESTING AND CERTIFICATION, 39

LIVING BY WATER GUIDEBOOK, 64

LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING, 39

MAJOR MAINTENANCE AND RESIDENTIAL RENOVATION: A SURVEY OF MEANS TO IMPROVE THE ARCHITECTURAL ACCESSIBILITY OF EXISTING BUILDINGS, 93

MANUFACTURED HOUSING CONSULTANTS' TRAINING PROGRAM - PHASE II, 53

MANUFACTURED HOUSING: UPDATING AND REWRITING LOCAL REGULATIONS: REGIONAL DISTRICT OF NORTH OKANAGAN = L'HABITATION USINÉE : MISE À JOUR ET RÉÉCRITURE DES RÈGLEMENTS LOCAUX : DISTRICT RÉGIONAL DE NORTH OKANAGAN, 54

MAXIMUM DAY WATERING DEMAND PHASE II - ASSESSMENT OF WATER CONSERVATION STRATEGIES, 66

MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS, 39

MOLD CLEANUP PROCEDURES: CONTRACTORS' GUIDE, 55

MOLD IN HOUSING: AN INFORMATION KIT FOR FIRST NATIONS COMMUNITIES, 55

MONITORING INNOVATIVE MECHANICAL AND ELECTRICAL SYSTEMS, 40

MONITORING THE PERFORMANCE OF AN EIFS RETROFIT ON A 15 STOREY APARTMENT BUILDING, 40

MONTRÉAL: A GREAT TRADITION OF MEDIUM-DENSITY HOUSING, 49

MULTIPLE HOUSING FOR COMMUNITY SUSTAINABILITY, 108

MUNICIPAL SURVEY OF REGULATORY REFORM, 97

NATIONAL RENOVATORS' TRAINING PROGRAM - REVISION 2000, 61

NON-PAYMENT OF RENTS AND THE HEALTH OF THE RENTAL SECTOR IN QUEBEC, 101

NON-REGULATORY INTERVENTIONS FOR ROOMING HOUSES/SROS AND TENANTS, 101

NORTH WEB-SITE, 57

NORTHERN HEALTHY HOUSE DEMONSTRATION, 57

NORTHERN HEATING AND VENTILATION SYSTEMS, 29

ONE-STOP APPROVAL FOR MINOR RESIDENTIAL RENOVATIONS, ANDRÉ FORTIN, ARCHITECT, MONTRÉAL, QUEBEC = PROJET D'AUTORISATION INSTANTANÉE POUR LES TRANSFORMATIONS RÉSIDENTIELLES MINEURES, ANDRÉ FORTIN, ARCHITECTE, MONTRÉAL (QUÉBEC), 98

ON-SITE WATER QUALITY MONITORING AND CONTROL SYSTEMS, 66

OPERATING AND MAINTENANCE BOOKS FOR MECHANICAL AND ELECTRICAL SYSTEMS IN MULTI-UNIT BUILDINGS, 41

OPTIMIZING HEAT AND AIR DISTRIBUTION SYSTEMS WHEN RETROFITTING HOUSES FOR ENERGY EFFICIENCY, 26

OVERVIEW OF CONSUMER PROTECTION FOR HOUSING IN CANADA, 22

PARTICIPATION METHODOLOGY TO GENERATE SUSTAINABLE URBAN COMMUNITY PLANNING, 108

PART-LOAD AND FROSTING CONTROL FOR ROTARY ENERGY WHEELS USED IN RESIDENTIAL BUILDINGS, 29

PENETRATION OF THE MULTIPLE HOUSING SECTOR IN THE UNITED STATES, 87

PERFORMANCE ASSESSMENT OF BOOSTER PUMP CONTROLS FOR WATER AND ENERGY CONSERVATION, 67

PERFORMANCE ASSESSMENT OF LOW FLOW TOILETS, 67

PERFORMANCE ASSESSMENT OF THE LEBRETON FLATS DISTRICT HEATING SYSTEM, 30

PERFORMANCE GUIDELINE DEVELOPMENT FOR BASEMENT SYSTEMS AND MATERIALS, 17

PERFORMANCE MONITORING OF A BRICK VENEER/STEEL STUD WALL SYSTEM: PHASE 4 RESULTS: REVISION 1, 41

PERFORMANCE MONITORING OF AN INNOVATIVE HIGH-RISE RESIDENTIAL BUILDING, 42

PERFORMANCE OF PLASTIC AND COMPOSITE MASONRY TIES, 19

PHILANTHROPIC SUPPORT FOR AFFORDABLE HOUSING: FINAL REPORT, 83

PRACTICES FOR SUSTAINABLE COMMUNITIES, 64

PRINCE EDWARD ISLAND BIRTH COHORT STUDY OF MOLD IN HOMES, 51

PRIORITIZED PRACTICAL APPROACHES FOR ESSENTIAL REMEDIATION, REPAIR AND MAINTENANCE PROJECTS, 61

PRO-HOME: A PROGRESSIVE, PLANNED APPROACH TO AFFORDABLE HOME OWNERSHIP, 103

PROJECT TO ENCOURAGE TRIPLEX AND QUADRUPLIX HOUSING, CITY OF NANAIMO, BRITISH COLUMBIA = PROJET VISANT À ENCOURAGER LES TRIPLEX ET QUADRUPLIX, VILLE DE NANAIMO (COLOMBIE-BRITANNIQUE), 103

PROJECT TO PROMOTE IMPLEMENTATION OF THE NATIONAL BUILDING CODE AND A STANDARDIZED BUILDING PERMIT IN PRINCE EDWARD ISLAND: THE HOME BUILDERS' ASSOCIATION OF PRINCE EDWARD ISLAND = PROJET VISANT À PROMOUVOIR L'ADOPTION DU CODE NATIONAL DE BÂTIMENT ET D'UNE FORMULE UNIFORMISÉE DE DEMANDE DE PERMIS DE CONSTRUIRE À L'ÎLE-DU-PRINCE-ÉDOUARD : LA HOME BUILDERS' ASSOCIATION OF PRINCE EDWARD ISLAND, 18

PROPOSAL FOR RESEARCH AND CONSULTATION ON INUIT HOUSING, 71

PUBLIC HOUSING TENANT SELF-MANAGEMENT: AN EVALUATION OF THE ALEXANDRA PARK CO-OP CONVERSION PROCESS IN TORONTO, 75

QUALITY ASSURANCE PROTOCOL TEST DRIVE, 42

RAIN PENETRATION CONTROL: APPLYING CURRENT KNOWLEDGE, 42

RECOGNITION OF SECONDARY SUITES IN THE NATIONAL BUILDING CODE, 18

REDUCTION OF AIR INTAKE CONTAMINATION OF HIGH-RISE RESIDENTIAL BUILDINGS (ERP), 30

REFINING OF CMHC HOUSING AFFORDABILITY INDICATORS, 84

REGIONAL ROAD CORRIDOR DESIGN GUIDELINES. SOCIO-ECONOMIC RESEARCH HIGHLIGHT; NO. 52, 110

REGULATORY FACTORS IN THE RETENTION AND EXPANSION OF ROOMING HOUSE STOCK: FINAL REPORT, 101

REMEDIATION OF MOISTURE TROUBLED WOOD FRAMED BUILDINGS IN THE COASTAL CLIMATE OF B.C., 43

RENOVATING THE HOME FOR ASTHMA: AN INTERVENTION STUDY, 51

REPAIR AND RETROFIT CASE STUDIES FOR MULTI-UNIT RESIDENTIAL BUILDINGS, 43

REPAIR AND RETROFIT CASE STUDIES OF THE LOFTS CORTICELLI COMPLEX, 44

RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY, 52

RESEARCH ON SOLUTIONS TO PYRITE-RELATED BACKFILL EXPANSION PROBLEMS, 48



RESEARCH STUDY ON THE HOUSING MARKET IN THE UNITED KINGDOM, 88

RESIDENTIAL FOUNDATION SYSTEMS FOR PERMAFROST REGIONS, 57

RESIDENTIAL GREENWAYS IN TRANSITION: FOUR DECADES OF PRACTICE IN WATERLOO, 64

RESIDENTIAL INTEGRATION OF YOUNG MIGRANTS IN QUEBEC, 111

RETROFITTING A CITY - LESSONS FROM TORONTO'S BETTER BUILDINGS PARTNERSHIP PROGRAM, 26

RETROFITTING RUSSIA'S HOUSING STOCK: OPPORTUNITIES AND OBSTACLES FOR CANADIAN EXPORTERS, 88

REWRITING TEST STANDARD CAN/CGSB-149.10 - DETERMINATION OF THE AIRTIGHTNESS OF BUILDING ENVELOPES BY THE FAN DEPRESSURIZATION METHOD, 19

RISK SHARING AND LOAN GUARANTEE MEASURES, 84

ROLE OF CONSTRUCTION CODES IN THE CANADIAN BUILDING SYSTEM, 19

SÉCURITÉ EN CAS D'INCENDIE : PERSONNES À MOBILITÉ RÉDUITE VIVANT EN MILIEU RÉSIDENTIEL RÉGULIER, 106

SERVICE LIFE OF MULTI-UNIT RESIDENTIAL BUILDING ELEMENTS AND EQUIPMENT, 20

SKILL SHORTAGES IN THE RESIDENTIAL CONSTRUCTION INDUSTRY, 80

SOIL AND FLORA RESTORATION AFTER GROUND DISTURBANCE, 65

SPACE EFFICIENT UNIVERSAL DESIGN INNOVATIONS, 93

SPECIAL STUDIES ON 1996 CENSUS DATA, 81

STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS, 22

STATE AND PROVINCIAL AFFORDABLE HOUSING MANDATES AND MEASURES, 84

STUDY OF DISPLACEMENT VENTILATION SYSTEMS FOR RESIDENTIAL HOUSES WITH RADIANT FLOOR HEATING SYSTEMS, 52

STUDY OF SPATIAL ORIENTATION IN A RESIDENTIAL COMPLEX FOR SENIORS WITH OR WITHOUT COGNITIVE DISORDERS, 106

STUDY OF TENANT EXITS FROM HOUSING FOR CHRONICALLY HOMELESS PEOPLE, 79

STUDY OF THE MIDWEST BUILDING PRODUCTS MARKET IN THE REGIONS OF ILLINOIS, WISCONSIN AND MISSOURI, 88

STUDY ON THE HOUSING SECTOR'S PRODUCTIVITY GROWTH, 80

STUDY ON U.S. RENOVATION MARKET, 89

SUMMARY REPORT FOR CONSORTIUM ON FIRE RESISTANCE AND SOUND INSULATION OF FLOORS: SOUND TRANSMISSION CLASS AND IMPACT INSULATION CLASS RESULTS, 16

SURREY'S USE OF INTERACTIVE TOUCH-SCREEN TECHNOLOGY TO EXPEDITE CLIENTS REQUESTS FOR BUILDING PERMIT AND DEVELOPMENT PROCESS INFORMATION: THE CITY OF SURREY PLANNING AND DEVELOPMENT DEPARTMENT = UTILISATION DE LA TECHNOLOGIE INTERACTIVE À ÉCRAN TACTILE PAR LA VILLE DE SURREY AFIN D'ACCÉLÉRER LE TRAITEMENT DES DEMANDES DE PERMIS DE CONSTRUIRE ET D'INFORMATION SUR LE PROCESSUS D'AMÉNAGEMENT : SERVICE D'URBANISME ET D'AMÉNAGEMENT DE LA VILLE DE SURREY, 98

SURVEY OF MULTI-UNIT RESIDENTIAL BUILDING CHARACTERISTICS AND ENERGY USE DATA, 26

SUSTAINABLE DEVELOPMENT IN CANADA, 89

SUSTAINABLE MUNICIPAL INFRASTRUCTURE DESIGN FOR A RESIDENTIAL DEVELOPMENT, 104

TAKING ANOTHER LOOK AT MIXED INCOME COMMUNITIES: WHO ARE THE MARKET TENANTS LIVING IN SOCIAL HOUSING (ERP), 106

TECHNICAL ASPECTS OF SELLING NEW HOMES, 45

TECHNICAL AUDIT COURSE FOR PROPERTY MANAGERS, 58

TECHNOLOGY DISSEMINATION - A NEW APPROACH, 48

TECHNOLOGY ROAD MAP FOR INTELLIGENT BUILDINGS TECHNOLOGIES, 44

TESTING CONSUMER RECEPTIVITY TO SUSTAINABLE COMMUNITY DESIGN FOR A DEMONSTRATION -BUILD SITE IN OKOTOKS, ALBERTA, 109

TESTING OF DYNAMIC BUFFER ZONE (DBF) METHOD, 44

THERMOSTAT SURVEY OF HOUSES WITH HYDRONIC, IN-FLOOR HEATING, 30

TRENDS AND CHANGES IN JAPANESE BUILDING REGULATIONS, 89

TRENDS IN THE JAPANESE HOUSING MARKET, 90

UPDATE OF THE STUDY ON MID-ATLANTIC BUILDING MATERIALS MARKET, 90

URBAN ABORIGINAL ACCESS TO HOUSING (AND HOMELESSNESS), 71

USE OF COMPRESSED-AIR-FOAM TECHNOLOGY FOR FIRE PROTECTION OF HOUSING IN THE NORTH, 58

VIRTUAL SAMPLE ROOM WEB SITE OF GREEN BUILDING MATERIALS - PHASE II, 20

WATER QUALITY MONITORING OF THE TORONTO HEALTHY HOUSE, 67

YOUR NEXT MOVE: CHOOSING A NEIGHBOURHOOD WITH SUSTAINABLE FEATURES, 109





Visit our Web site at: [www.cmhc-schl.gc.ca](http://www.cmhc-schl.gc.ca)



# CURRENT HOUSING RESEARCH

CA1  
MH  
H57

VOLUME 8, NUMBER 2  
FALL 2001

**SOCIAL,  
ECONOMIC AND  
TECHNICAL  
RESEARCH**



HOME TO CANADIANS  
Canada

Issued also in French under the title: ***Recherches courantes sur l'habitation***

Publié aussi en français sous le titre: ***Recherches courantes sur l'habitation***



## CURRENT HOUSING RESEARCH ORDER FORM

If you wish to receive any of the completed reports or bibliographies listed, or if you would like to be on the mailing list to receive *Current Housing Research*, please fill out this form and send it to:

Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa ON K1A 0P7  
Fax (613) 748-4069  
Telephone 1-800-668-2642  
Email: [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)

### COMPLETED REPORTS REQUESTED


### BIBLIOGRAPHIES REQUESTED


☐ Send copies of above reports/bibliographies

☐ Add my name to your mailing list to receive *Current Housing Research*

Name		
Mailing Address		
City	Province	Postal Code



## INTRODUCTION

Welcome to "*Current Housing Research*". This publication merges "*Housing Research Quarterly*" and "*Current Housing Technology Initiatives*" and continues the numbering of the "*Housing Research Quarterly*".

Under Part IX of the National Housing Act the Government of Canada provides funds to Canada Mortgage and Housing Corporation to conduct research into the social, economic and technical aspects of housing and related fields.

*Current Housing Research* is compiled and produced two to three times a year by the Canadian Housing Information Centre. This publication provides information and access to research which is undertaken and sponsored by the Corporation. It is also available on CMHC's web site at [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)

The publication contains information on completed research reports, new publications, videos and bibliographies, as well as planned and ongoing research projects. An alphabetical title index of items listed is included at the end for quick reference.

The overall arrangement of "*Current Housing Research*" is by broad subject category. Within each subject category, lists of planned and ongoing projects and completed research reports are described.

Each entry can contain the following elements:

- The project or report title;
- A description of the project or report results;
- The CMHC Project Officer who is managing the project;
- The Division within CMHC which is responsible for the project;
- For External Research Projects, the grant recipient undertaking the research;
- A Contract Identification Number (CIDN);
  
- The Status of the project: whether the project is in a planned, ongoing or completed phase.  
"Planned Projects" are those that are not yet underway, but are likely to be initiated in the current year. "Ongoing Projects" refer to research projects which are currently underway. No reports are yet available. Once the project is completed, and a report is available for distribution, it will be listed as a "completed report."
  
- Whether the report resulting from the research project is available and the address where the completed report can be obtained.

To discuss research projects that are recent or ongoing, please call CMHC General Inquiries at (613) 748-2000 and ask for the CMHC Project Officer identified under each project description.





## CMHC'S EXTERNAL RESEARCH PROGRAM

The objective of the CMHC External Research Program (ERP) is to encourage and enable researchers in the private and not-for-profit sectors to put forward and carry out relevant, innovative, and high quality housing research projects. Under the Program, financial contributions are made to support research investigations into important questions, problems, and issues affecting Canadian housing. Housing research priority areas are identified in the "External Research Program Grants for Housing Research Guidelines and Application Form".

Applicants to the External Research Program must be Canadian citizens or have permanent resident status in Canada.

Independent researchers as well as those employed in Canadian universities, institutions, private consulting firms, the professions and the housing industry may apply for these grants.

Full-time students at the graduate or undergraduate level are not eligible to apply. Students may be hired to assist in the conduct of the research, but under no circumstances may they take over responsibility for the direction of the work or the quality of the final report.

Individuals who are full-time federal, provincial or municipal government employees may apply. However, to be eligible, an applicant must provide a letter of support from her/his employer which shows that the proposed research is not part of, and will not interfere with, her/his regular work. CMHC employees are not eligible to receive grants under this Program.

CMHC is interested in receiving applications on topics related to its housing research priority areas. New ideas and innovative approaches in these areas are welcome.

To obtain the booklet outlining the priority research areas, the guidelines and application form for the External Research Program you may contact:

The Administrator  
CMHC External Research Program  
Research Division  
Canada Mortgage and Housing Corporation  
700 Montreal Road, Room C7-307  
Ottawa, Ontario  
K1A 0P7  
Telephone: 613-748-2249  
Fax: 613-748-2402  
E-mail: [erp@cmhc-schl.gc.ca](mailto:erp@cmhc-schl.gc.ca)





## TABLE OF CONTENTS

	PAGE
Order Form	1
Introduction	3
Subject Index	9
Technical research	13 - 74
Social and Economic Research	75 - 129
Bibliographies	131 - 135
Title Index	136 - 147



## SUBJECT INDEX

Aboriginal Housing .....	13, 77	Housing Export Opportunities .....	98
Acoustics .....	15	Housing Forecasting and Demand .....	103
Basements, Foundations & Crawlspace ..	15	Housing Market .....	104
Building Codes & Standards .....	17	Indoor Environment .....	49
Building Materials .....	18	Manufactured Housing .....	53
Children's Environments .....	81	Moisture and Mold .....	54
City Planning and Human Settlements ..	82	Mortgages and Housing Finance .....	105
Concrete .....	20	Northern Housing .....	57, 106
Consumer Protection .....	84	Persons with Disabilities .....	106
Contaminated Lands .....	20	Population Health .....	108
Cooperative and Non-profit Housing ...	85	Property Management .....	62
Doors and Windows .....	21	Regulatory Reform .....	109
Energy Conservation .....	21	Renovation and Inspection .....	62, 114
Fires & Fire Prevention .....	26	Rental Housing .....	114
Heating and Ventilation .....	27	Residential Development .....	117
High-Rise and Multiple Unit Construction	30	Seniors .....	119
Home Ownership .....	44, 86	Social Housing .....	122
Homelessness .....	87	Sustainable Development & Healthy Housing .....	67, 123
House Construction .....	44	Urban Transportation .....	128
House Construction Industry .....	48, 91	Water Conservation, Reuse & Management .....	70
Housing .....	92	Women and Housing .....	129
Housing Affordability .....	94	Youth and Housing .....	129
Housing and Immigration .....	97		
Housing Design .....	49		





## TECHNICAL RESEARCH





## ABORIGINAL HOUSING: LOCAL DESIGN AND MATERIAL

This project responds to opinion that house designs found in Aboriginal communities are inappropriate and that perfectly good building materials exist on reserve but are never used. The project assumes that in fact there are a significant number of examples where appropriate designs have been put in place and where the potential use of local material has been investigated. The project will identify these examples, and document a selected number of them as case studies. The case studies will produce material suitable for dissemination.

The general approach is:

- to build an inventory of past initiatives on increasing the Aboriginal relevance of housing design and on assessing the feasibility of using local materials,
- to select a range of examples from the inventory for case study analysis, and
- to draw conclusions along the lines of "lessons learned".

**CMHC Project Officer :** Phil Deacon

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** N/A

**STATUS :** Ongoing

**\* NEW \***

## BUILDING COMMUNITIES: FIRST NATIONS BEST PRACTICES FOR HEALTHY HOUSING AND SUSTAINABLE COMMUNITY DEVELOPMENT

This publication focuses on proven alternative construction methods, materials and approaches to achieve sustainable Healthy Housing and community development. "Building Communities" outlines and explains new and efficient:

- Construction methods and materials.
- Cutting-edge technologies in electrical co-generation systems.
- Natural, or biological, sewage and waste water treatment systems.
- Alternative heat generation systems
- Innovative transportation systems that could reduce some of the problems providing construction products and materials to remote and fly-in communities.

"Building Communities" outlines the importance of planning to create an integrated approach to Healthy Housing and community and economic development. It illustrates and explains some examples of Healthy Housing systems. It gives the principles that CMHC uses for Healthy Housing and community development. It uses as examples:

- CMHC's Healthy House in Toronto.
- The Eagle Lake First Nation Northern Healthy House.
- The Roseau River First Nation Healthy House.
- The Mohawks of the Bay of Quinte R-2000 Homes.
- The Mohawk Community of Kahnawake proposed Healthy House and the community's long-term sustainable development planning strategy.
- The EcoNomad™ self-contaminated utilities unit.

*Prepared by Morgan Green, Onkwehonwene Anishinabek Sustainable Integrated Systems. CMHC Project Officer: Alain Croteau. Ottawa: Canada Mortgage and Housing Corporation, c2001. 56 pages*

Order number: 62317

*Note: Aussi disponible en français sous le titre : Bâtissons ensemble : meilleures pratiques autochtones d'établissement de maisons saines et de collectivités durables*

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## COST-EFFECTIVE INDOOR AIR QUALITY AND ENERGY EFFICIENCY RECOMMENDATIONS FOR FIRST NATIONS HOUSING

The purpose of this research project was:

-- to prove that less capital investment in First Nations housing but acceptance of higher costs incurred over the life cycle of a house is not cost-effective;-- to demonstrate the potential for cost-effective, improved housing in First Nations communities; and-- to demonstrate the value of investigations according to the CMHC Indoor Air Quality Investigative Protocol and the Energuide for Houses Evaluation Protocol as repeatable, effective renovation planning methods that could be implemented by First Nations technical service providers.

Indoor air quality investigations and house energy efficiency evaluations, according to the recognized protocols noted above, were conducted on five sample houses volunteered by the Washagamis Bay First Nation.

The research found that the sample of First Nations houses that were investigated were built with low capital expenditure which in the long run compromised the indoor air quality and durability of the houses as well as increased the maintenance costs. The study showed that it is cost effective to implement energy saving strategies at the same time as improving the indoor air quality of the homes.

*Prepared by Bill Boles. CMHC Project Officer: Virginia Salares. Ottawa: Canada Mortgage and Housing Corporation, 2001 (External Research Program)*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## DEMONSTRATION OF HEALTHY HOUSING ON RESERVE

This project is being undertaken in partnership with First Nations communities. The objectives are to support the design, construction and demonstration of five on-reserve Healthy Houses near Montreal, Belleville, Thunder Bay, Winnipeg, and on band land in N'Dilo and Dettah near Yellowknife. To date, four houses have been built and demonstrated in the following communities - Kanawake QC, Eagle Lake ON, Roseau River MB, plus several micro-sewage treatment systems in NT. Native communities own and occupy these demonstration houses, which were constructed by locally trained trades and specialists. A goal of the project was to better equip First Nations community and other decision makers, and the public to understand the importance of constructing more affordable, appropriate and environmentally sustainable housing. A CMHC report will be produced detailing house costs and benefits, designs and systems at the completion of the project. An About Your House summary has already been published which describes the Eagle Lake Healthy House and its matching "EcoNomad" utilities container. A 30 minute video has also been prepared which describes the Kanawake Healthy House and their plans to build a "sustainable subdivision" of 27-35 homes on a ten acre "ecovillage" site. The Tyendinaga Mohawks (near Belleville ON) have already built four Granny Houses and five Seniors homes which meet Healthy Housing IAQ goals (Indoor Air Quality). This community is now preparing to design and build a "sustainable subdivision" of some 36 homes, not just one demonstration Healthy House. The N'Dilo and Dettah communities have installed micro-sewage systems in several homes, following the demonstration and testing of a prototype micro-system in a single family house. The performance of these micro-systems is now being monitored in collaboration with the NT Housing Corporation.

**CMHC Project Officer :** Chris Ives

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :**

**STATUS :** Ongoing

**\* NEW \***

**\*\* SEE ALSO:** p. 77-81 and Mold in Housing: An Information Kit for First Nation Communities, p. 56.

### SUMMARY REPORT FOR CONSORTIUM ON FIRE RESISTANCE AND SOUND INSULATION OF FLOORS: SOUND TRANSMISSION CLASS AND IMPACT INSULATION CLASS RESULTS

The IRC Acoustics Laboratory has completed the measurement phase of a study of airborne and impact sound transmission through typical floor constructions used in Canadian housing. As well as the Institute for Research in Construction (IRC) of the National Research Council of Canada, this project was supported by a consortium of some 18 different organizations and government departments, including Canada Mortgage and Housing Corporation and the Canadian Home Builders' Association. This report presents the sound transmission class (STC) and impact insulation class (IIC) ratings for all the floors in the project. Some of the specimens were chosen by IRC for technical reasons, but the majority of the specimens were approved as part of a structured series established collectively by the consortium. The acoustical measurements included impact sound measurements using experimental, non-standard devices. These measurements were made to provide extra information that might be used to improve the existing standardized tapping machine test or to develop new test procedures. A further IRC report will deal with these experimental impact measurements in detail. The combined set of over 190 specimens provides:-- data for systematic evaluation of sound transmission through joist floor systems;-- data for development of prediction methods;-- data for development of improved constructions; and-- a consistent assembly of sound transmission class and impact insulation class data needed by builders and regulators to select constructions suitable for party floors in multi-family dwellings.

*Prepared by A.C.C. Warnock and J.A. Birta, Institute for Research in Construction, National Research Council Canada. Ottawa: Canada Mortgage and Housing Corporation, 2001, c1998. xiv, 121 pages*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## BASEMENTS, FOUNDATIONS & CRAWLSPACES

### COMPREHENSIVE STUDY ON SLAB-ON-GRADE FOUNDATIONS

The purpose of this project is to investigate and provide answers to technical questions on slab-on-grade insulation, moisture protection, and heating systems appropriate to be used with such a foundation type, and cost effectiveness in various climate regions of Canada. Other aspects to be studied will be: consumer acceptance of this type of "basementless" house; alternate layout designs to accommodate storage; overall pros and cons of the alternative house foundation type.

**CMHC Project Officer :** Ken Ruest

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2275 0200

**STATUS :** Planned



## INSULATED CONCRETE FORMS TRAINING PROGRAM

This is a multi-partnered project with members including: Cement Association of Canada (CAC), Portland Cement Association (PCA), Insulating Concrete Form Association (ICFA), National Energy Conservation Association (NECA), Alliance of Canadian Building Officials Association (ACBOA), Association of Canadian Community Colleges (ACCC), Seneca College, Southern Alberta Institute of Technology (SAIT), Atlantic Home Builders' Training Board (AHBTB), Canadian Carpentry Union, CHBA, NRCan and CMHC. The CAC is managing the project on behalf of the partners. The purpose of this project is to develop and pilot a course curriculum and course training materials on how to properly construct insulated form foundation and building systems (ICFs). The course will consist of two modules; Introduction to Insulated Concrete Form Construction, and Fundamentals of Concrete Footings and Foundations. It will be promoted to ICF installers, home builders, home inspectors, building officials, and the trades involved in the installation of ICFs. The course will be developed and piloted in two phases over a two year period from 2000 to 2002 and the third phase will be implementation of the training program into various educational institutions across the country in 2002-2003.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2411 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PERFORMANCE GUIDELINE DEVELOPMENT FOR BASEMENT SYSTEMS AND MATERIALS

CMHC is a participant contributing research to this multi-disciplinary, multi-agency study led by the National Research Council identifying knowledge gaps in the performance of basement systems. Guidelines are being developed for design, construction and evaluation of basement materials and systems to ensure their durability and long-term performance. Field work is complete. Guidelines are being drafted. CMHC will look into ways to inform builders and the public about better basement designs.

**CMHC Project Officer :** Don Fugler

**CIDN :** 1421 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PRACTICAL MEASURES FOR THE PREVENTION OF BASEMENT FLOODING DUE TO MUNICIPAL SEWER SURCHARGE

This External Research Program (ERP) project is to study practical measures currently available to homeowners experiencing basement flooding problems, and builders constructing new homes within sewer surcharge-prone areas.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2437 0200010

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

### UNDERSTANDING AND DEALING WITH INTERACTIONS BETWEEN TREES, SENSITIVE CLAY SOILS AND FOUNDATIONS. ABOUT YOUR HOUSE; CE3 I

This About Your House publication provides background information and advice on understanding and dealing with interactions between trees, sensitive clay soils and foundation problems. It describes where these soils exist, the impact of soil shrinkage on foundations and the potential role of trees in soil shrinkage. It provides a summary of some of the important factors related to soil shrinkage and foundation stability, as well as tips for managing a tree's contribution to foundation damage.

Ottawa: Canada Mortgage and Housing Corporation, 2001. (*About Your House; CE3 I*) 8 pages

NOTE : Aussi disponible en français sous le titre : Comprendre l'interaction des arbres, du sol d'argile sensible et des fondations et agir en conséquence

**STATUS :** New Completed Fact Sheet

**AVAILABILITY :** CMHC Information Products and available on CMHC's Web site. To download this document visit CMHC's Web site at:  
<http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/index.cfm>

**\*\* SEE ALSO :** - Residential Foundation Systems for Permafrost Regions, p. 60

- Improvements to the Moisture Performance of Preserved Wood Foundations, p. 56

- Innovative Foundations, Heating & Ventilation, p. 58

## BUILDING CODES

### PROJECT TO PROMOTE IMPLEMENTATION OF THE NATIONAL BUILDING CODE AND A STANDARDIZED BUILDING PERMIT IN PRINCE EDWARD ISLAND: THE HOME BUILDERS' ASSOCIATION OF PRINCE EDWARD ISLAND = PROJET VISANT À PROMOUVOIR L'ADOPTION DU CODE NATIONAL DU BÂTIMENT ET D'UNE FORMULE UNIFORMISÉE DE DEMANDE DE PERMIS DE CONSTRUIRE À L'ÎLE-DU-PRINCE-ÉDOUARD : HOME BUILDERS' ASSOCIATION OF PRINCE EDWARD ISLAND

This case study report describes the work in 1998 of the P.E.I. Home Builders' Association to persuade municipal and provincial authorities to adopt the National Building Code and to implement a uniform building and development permit application form. Of the 89 municipalities in Prince Edward Island, only two, Charlottetown and Summerside, apply and enforce the NBC. There is also no building code enforcement in unincorporated areas of the province. The study outlines the arguments in favour of adoption, including consumer protection, safety, financial and industry issues and the impacts on affordability, choice and quality. The standardized permit application form developed by the P.E.I. Home Builders Association is included as an appendix.

Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2000. (*Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study*) 36 pages

Order Number: 62001

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

### REWRITING TEST STANDARD CAN/CGSB-149.10 - DETERMINATION OF THE AIRTIGHTNESS OF BUILDING ENVELOPES BY THE FAN DEPRESSURIZATION METHOD

The airtightness standard used for testing houses dates back to 1986. The object of this project is to re-write CAN/CGSB-149.10, incorporating some updates and some alternative techniques. There have been no meetings up until now but there has been extensive consultation by e-mail and document review. Progress has been delayed due to the lack of consensus by committee members. The contractor who assembled the new draft of the document is looking into modifications of the text to satisfy some of the objections.

**CMHC Project Officer :** Don Fugler

**CIDN :** 1971 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ROLE OF CONSTRUCTION CODES IN THE CANADIAN BUILDING SYSTEM

The purpose of this joint venture project with NRC and CHBA is to develop two papers which will help in the understanding of the changes to the Model National Codes which are occurring as a result of efforts currently underway to clarify the objectives of these codes and move them to being Objective-Based. The first paper is entitled "Canada's Construction System and the Context for Model Codes". It presents an overview of the system of construction in Canada and the role of Model Codes in that system. The second paper describes the value and benefits of Objective-Based Codes to residential builders and renovators. The papers have been published by NRC.

**STATUS :** Completed report

**AVAILABILITY :** On the Internet: <http://www.ccbfc.org/ccbfc/tgs/obc/docs/>

## BUILDING MATERIALS

### PERFORMANCE OF PLASTIC AND COMPOSITE MASONRY TIES

The objective of this project is to investigate the possibility of using alternative materials (plastics or composites) in the fabrication of masonry ties. Detailed research will be undertaken to determine what has been done in the field of masonry ties around the world. The information received will be reviewed with respect to the appropriateness of plastic or composite masonry ties for masonry construction and the opportunities they represent.

**CMHC Project Officer :** Luis de Miguel

**CIDN :** 2144 0200020

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## SEISMIC PERFORMANCE OF RAINSCREEN STUCCO

This comprehensive study on the earthquake resistance of different stucco wall systems is underway at the University of British Columbia and includes an extensive test series to determine the strength of different stucco types, static cyclic tests of single wall specimens, the analytical modeling of wall systems with stucco, and the dynamic testing of entire wall systems, leading to design recommendations for engineers and architects.

**CMHC Project Officer :** Silvio Plescia

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2480 0200001

**STATUS :** Ongoing

## SERVICE LIFE OF MULTI-UNIT RESIDENTIAL BUILDING ELEMENTS AND EQUIPMENT

Maintaining Canada's housing stock requires timely investment of funds for replacement of building elements and equipment. CMHC engaged IBI Group to survey experienced building professionals across Canada to obtain real life, non-theoretical estimates of service life for over 230 components in apartment buildings over five storeys high. The information was collected through a three-stage survey and analysis process resulting in an average high-end and low-end estimate of service life for each building item. The resulting range was then divided into approximately equal three sub-ranges: below average, average and above average length of service life. Using a model building, costs were developed based on specific assumptions for length of building life, inflation rate for construction and discount rate. This information produced a range of annual contribution amounts necessary to maintain the reserve fund. This report summarizes the study, lists the results and describes a process to make immediate use of the information.

A generic reserve fund cash flow model has been prepared as part of this project. You may obtain a copy of the Excel spreadsheet from the following URL address:

<ftp://ftp.cmhc-schl.gc.ca/servicelife>

*Prepared by IBI Group. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2000. (Housing Technology Series) 68 pages*

Order Number: 62280

*Note : Aussi disponible en français sous le titre : La Durée de vie utile des matériaux et équipements techniques des édifices résidentiels de moyenne et grande hauteur*

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

## VIRTUAL SAMPLE ROOM WEB SITE OF GREEN BUILDING MATERIALS - PHASE II

The Virtual Sample Room is a web site that provides information for designers, builders, renovators, and consumers on building materials that are environmentally responsible and/or minimize indoor air pollution. The site was developed and continues to be owned by a consortium of federal government departments and municipalities. The purpose of this Phase II project was to expand the number of product listings from the original 200, and to improve the promotion of the site. The site now includes approximately 750 product listings, covering almost all areas of construction, and is being promoted by the various partners. The site has a new URL and will be "re-launched" later in 2001. The site is now active and can be visited at <http://www.designinggreen.com/>.

**STATUS :** Completed Report

**AVAILABILITY :** On the Internet: <http://www.designinggreen.com/>.

## BEST PRACTICE GUIDE FOR PRE-CAST CONCRETE WALLS

The objective of this project is to develop a practical, advisory document for designers, architects and engineers, and manufacturers, related to precast wall panels in residential applications. Precast is a well developed system in commercial applications but it requires special treatment when used in housing. The project will be conducted in partnership with the Canadian Precast and Prestressed Concrete Institute, installers and their associations. This Guide will be produced as a joint publication through a collaborative project with Public Works Government Services Canada. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to precast walls, construction details in AutoCAD format, outline specifications and additional sources of information and references. The anticipated release date for the product is April 2002.

**CMHC Project Officer :** Luis de Miguel

**CIDN :** 2215 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS

This project will research current assessment, monitoring and repair strategies for concrete repair. Existing protocols commonly used in the field as well as existing protocol guidelines assembled by various agencies (e.g. CSA) will be catalogued. This research will provide consultants, contractors and building owners with available protocols and concrete repair strategies.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 1890 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

# CONTAMINATED LANDS

## DEMONSTRATION OF SAFE HOUSING ON LIGHTLY CONTAMINATED LANDS

CMHC research into contaminated lands shows that some types of soil contaminants could be rendered innocuous through building design and operation. One example is heavy metals deep within the soil. If these pollutants can be avoided through design, the cost of land remediation could be greatly reduced. The project will include contaminant monitoring and the investigation of the predictive capabilities of site specific risk assessments. Two of the three case studies are complete: a potential soil gas movement problem in a Vancouver high-rise and heavy metals moving from fill in the vicinity of Wells, BC. A third potential location has been identified in the Yukon. Testing will have to follow construction of the houses, which may not take place until 2002.

**CMHC Project Officer :** Don Fugler

**CIDN :** 1946 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## DOORS AND WINDOWS

### LEAK-PROOFING WINDOWS, PHASE I - FABRICATION, INSTALLATION AND MAINTENANCE

The Survey of Building Envelope Failures in the Coastal Climate of British Columbia revealed that exterior moisture penetration through and/or around windows (at window wall interfaces) is a significant contributor to the envelope moisture problem. The objective of this project is to undertake a study which identifies the nature and causes of moisture ingress problems associated with windows and window to wall interfaces. The study will identify and recommend solutions for addressing water penetration problems associated with all aspects of the window manufacturing, design, installation and in-service maintenance. This work is underway and is anticipated to be completed by the end of 2001.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2285 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### LEAK-PROOFING WINDOWS, PHASE II- WINDOW CODES, STANDARDS, TESTING, CERTIFICATION AND HARMONIZATION

This project's objectives are to undertake a study to review the CSA A440 standard (including all its attachments), window testing standards and protocols, the window certification process and the potential impact of harmonizing the A440 standard with the North American Fenestration Standard. The purpose is to identify those requirements related to the moisture penetration problems through and around window assemblies, into the building envelope of low rise (up to 4 storeys) wood-framed residential buildings.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2425 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ENERGY CONSERVATION

### AIR LEAKAGE CHARACTERISTICS, TEST METHODS AND SPECIFICATIONS FOR LARGE BUILDINGS

CMHC recently completed a survey of published air leakage data for multi-unit residential and large commercial buildings. The objective of the study was to compile air leakage data for large buildings, identify air leakage test methods, performance targets and the availability of specifications and quality control procedures to reduce air leakage in large buildings. The results of the review show that virtually all large buildings, both new and old, are quite leaky when compared to recommendations contained within the Appendices of the 1995 National Building Code of Canada. Measured air leakage levels range from 10 to 50 times recommended levels. Despite this, there have been several building projects that have demonstrated that air leakage can be significantly reduced when proper building air barrier details are designed and installed, and where quality assurance measures are in place. The information provided by this project serves to baseline the current performance of air barrier systems in conventional large buildings and also shows what levels of performance are possible with better design, construction, testing and commissioning methods. The project report will serve as an important reference document as efforts move forward to improve the quality of building envelope systems.

*Prepared by Gary Proskiw, Proskiw Engineering Ltd. and Bert Phillips, Unies Ltd. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2001. 85 pages*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



## ALTERNATIVE HOME ENERGY SOURCES FOR THE NORTH

This is a partnership project between Alaska Housing Finance Corporation, Arctic Energy Alliance and CMHC. Access to alternate energy in the North was an important issue identified in the 1998 Client Consultation. While much literature exists on alternative home energy sources, most of it is too complex for general comprehension. Further, much of this information has not been verified for applicability to the North including availability and performance of alternative energy products in the North. This project will provide a full summation of options, a cost benefit analysis based upon present individual utility infrastructures and costs as well as regional climatic requirements, reference and contact information.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2312 0200003

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS

An energy and greenhouse gas emission simulator will be developed to model the impacts of energy efficiency measures on large buildings. The energy simulator will be capable of analyzing the impact of individual, or packages of, energy efficiency measures on the energy consumption and greenhouse gas emissions of large commercial and multi-unit residential buildings. Regional and national energy and greenhouse gas emission reductions will be assessed by using the simulator to evaluate the impact of energy efficiency measures on the buildings in a representative building database. The results of the analysis will then be projected to national levels to determine the extent of retrofit measures that are required within the building stock to meet the reduction targets set by the Kyoto Protocol in December 1997.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2249 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CASE STUDIES OF MAJOR HOME ENERGY RETROFITS

To meet targets for greenhouse gas production in Canada, the residential sector will have to significantly reduce energy consumption in existing houses. A 1995 CMHC report suggested that houses built prior to 1989 will have to reduce energy consumption on average by about 40%. This is a big reduction, one that is rarely realized in programs funded by government or the utilities. The object of this research is to see whether four or more relatively normal houses can have their total energy usage reduced by 40%. Saskatchewan Research Council has been hired to determine this. The houses have been selected and the retrofits contracted by the owner should be completed by fall 2001. Monitoring for the next year will establish whether the 40 % goal can be achieved.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2349 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is in the process of documenting the application of energy efficiency measures in multi-unit residential buildings to be used as case studies. A trial case study of a housing co-operative in Ottawa is underway, to not only assess the strengths and weaknesses of the energy efficiency measures implemented, but also to identify what information can be disseminated to others in the building industry. Upon completion of this first case study, CMHC will be soliciting the housing industry for additional energy efficiency case studies. A compendium of case studies will be made available from CMHC. The case studies will also support the Energy Efficiency Opportunities Manual for Multi-Unit Residential Buildings that CMHC is in the process of developing. The case studies currently underway include:

1. Conservation Co-op, Ottawa
2. Dual Fuel Heating System, Oshawa
3. Energy Efficiency Retrofit of an Apartment Building, Toronto
4. Case Studies of Interior Insulation Retrofits in Buildings with Solid Masonry Walls (CMHC "A" Building, Ottawa; Lofts Corticelli, Montréal; Karcher Building, Prince Albert)
5. The Complete Rehabilitation of the Broadview Apartment building.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1899 0200002-3

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ENERGY EFFICIENCY OPPORTUNITIES MANUAL FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC, in partnership with the Ontario Ministry of Municipal Affairs and Housing (OMMAH), is in the process of developing a manual that details energy and water efficiency measures for existing multi-unit residential buildings. The document will be based on a manual originally developed by the Ontario Ministry of Housing in the early 1980's. The new manual will offer proven, current energy efficiency measures for the building envelope, mechanical, electrical, and domestic hot water heating systems. A web-based version of the manual is being developed that will be installed on the CMHC web-site. Individual energy and water efficiency measures are being placed on the high-rise group website as they are developed. The measures are being publicized as the energy and water efficiency "Tip of the Week" ([http:// www.cmhc-schl.gc.ca/ en/imquaf/himu/wacon/ waensatip/ index.cfm](http://www.cmhc-schl.gc.ca/en/imquaf/himu/wacon/waensatip/index.cfm)). The production of the web-based and translated version has also allowed for a simultaneous final editing of the manual in preparation for publication.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1887 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ENERGY USE PATTERNS IN OFF-GRID HOUSES

To consider opportunities to reduce greenhouse gas, a contractor surveyed twelve households across Canada which have been 'off the grid' for at least two years, with a focus on renewable energy sources such as solar, wind, and micro/mini-hydro. The contractor documented energy use and lifestyle patterns that accommodated the limits of off-grid electrical production. The objective was to provide examples of approaches relevant to mainstream housing. The field work is complete and the report is available as a research highlight on the CMHC website. There were no consistent energy saving measures that emerged from the research which are particularly suitable for mainstream houses. The report is useful however as an illustration of the variety of approaches used for off-grid housing and the range of energy consumption patterns in housing.

*Research Consultant: Shawna Henderson, Abri Sustainable Design. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2001. (Research Highlights; Technical Series: 01-103) 24 pages*

*NOTE : Aussi disponible en français sous le titre : Consommation d'énergie dans les maisons hors réseau*

**STATUS :** Completed Research Highlight

**AVAILABILITY :** CMHC Information Products and available on the CMHC web site

## FINANCIAL TOOLS FOR CO<sub>2</sub> REDUCTION

This project responds to Canada's planned Kyoto commitment to take actions that will help reduce CO<sub>2</sub> emissions. It aims to identify financial mechanisms that can encourage and accelerate the adoption of energy efficiency measures for existing and new housing. It will survey financial mechanisms that have been used in Canada and abroad and evaluate their potential for take up and energy use reduction. It will examine in more depth six initiatives and draw from them lessons that would apply to Canada's conditions. It will subsequently examine a number of initiatives for further consideration re: potential adoption and/or adaptation in Canada.

**CMHC Project Officer :** Fanis Grammenos

**CIDN :** 2281 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## LOW-TEMPERATURE HYDRONIC HEATING AND HIGH-TEMPERATURE COOLING: A CANADIAN OPTION FOR MORE SUSTAINABLE BUILDINGS

Residential and commercial buildings account for about 32% of secondary energy use in Canada, and for over 29% of greenhouse gas emissions. Space and water heating and space cooling needs account for over 80% of residential energy use and 70% of commercial energy use.

There are numerous approaches and technologies that can contribute to more sustainable buildings and communities. This report investigates a specific technical and philosophic approach to building energy use: the use of low-grade energy sources, low-temperature heating systems, and low-temperature cooling systems. The report outlines technical features, applications, benefits, opportunities, and obstacles associated with such systems.

*Prepared by Katherine Arkay Consulting. CMHC Project Officer: Ken Ruest. Prepared for Research Division, Canada Mortgage and Housing Corporation and Natural Resources Canada. Ottawa: Canada Mortgage and Housing Corporation, 2000. 2 volumes*

*Volume 1: Project Report (150 pages)*

*Volume 2: Consultation Process Results (47 pages)*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



## OPTIMIZING HEAT AND AIR DISTRIBUTION SYSTEMS WHEN RETROFITTING HOUSES FOR ENERGY EFFICIENCY

When a house undergoes energy upgrading, either by improving the envelope or the heating appliance, one factor often overlooked is the heating or ventilating distribution system. With support from the Program for Energy Research and Development (PERD), CMHC will be undertaking research into distribution system upgrades, probably in conjunction with other federal agencies. The first stage of this work is a review of the performance characteristics of current and innovative distribution systems. The review will establish the operating characteristics of HVAC equipment and distribution systems. This includes both old, existing systems; current, off-the-shelf components; and new distribution systems coming on the market. As well, this review identifies problems with the integration of upgraded heating or cooling systems and existing energy distribution systems in houses. The output of this project will help guide the next phases of the work: laboratory studies, field studies, and demonstrations. A draft report on the literature review has been submitted and has been circulated for comment.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2440 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RETROFITTING A CITY - LESSONS FROM TORONTO'S BETTER BUILDINGS PARTNERSHIP PROGRAM

The primary goal of this project is to help municipalities across North America improve energy efficiency in buildings and reduce their greenhouse gas emissions. Based on Toronto's successful Better Buildings Partnership Program the project will produce a useable manual for designing and implementing municipal building retrofit programs to improve water and energy efficiency. Building retrofits can reduce greenhouse gas emissions by lowering energy consumption. Undertaken on a wide scale, retrofitting buildings can enhance the sustainability of urban centres by diminishing air pollution locally and slowing the rate of consumption of natural resources.

**CMHC Project Officer :** Brian Eames

**CIDN :** 2355 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## SURVEY OF MULTI-UNIT RESIDENTIAL BUILDING CHARACTERISTICS AND ENERGY USE DATA

This project involves the collection of the physical and operational characteristics of 40 multi-unit residential buildings from all regions in Canada. Energy and water consumption histories for the past 2 to 3 years have also been collected for each building. The survey portion of this work is now complete. CMHC is in the process of developing a database to store the building files and to allow for the comparison of energy and water usage given building age, size, region, fuel type and occupancy. The building files will also be used in combination with an energy simulator-green house gas estimator to estimate the impact of upgrading the stock of multi-unit residential buildings in Canada. It is envisioned that the database will be supplemented with additional buildings that CMHC will access in the course of other research projects.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2249 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ENERGY CONSERVATION

### UPDATING THE AIRTIGHTNESS TESTING STANDARD

The airtightness testing standard, Canadian General Standards Board (CGSB) 149.10, was published in 1986 and requires updating and simplification. CMHC engaged a contractor to undertake this work in 1998/99. The new draft standard was balloted in the winter of 2000. Reviews and comments are currently being evaluated.

**CMHC Project Officer :** Don Fugler

**CIDN :** 1971 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## FIRES & FIRE PREVENTION

### CLEANING UP YOUR HOUSE AFTER A FIRE

After a Fire is a consumer publication being prepared to help homeowners deal with fire damage in their homes. This publication will explain the issues to be considered to restore the home and to ensure a safe, healthy environment for the occupants. It is intended to be a brief publication targeted to the consumer, but it will also be useful to fire departments, restoration contractors, and insurance companies.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 2298 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### INVESTIGATION OF SMOKE CONTROL IN HIGH-RISES BY POSITIVE PRESSURE VENTILATION

A research project has been initiated to study the use of positive pressure ventilation (PPV) systems to contain and expel smoke from high-rise buildings during a fire emergency. PPV systems have been used in the U.S. in low-rise buildings. The system consists of a portable, high velocity fan which is used by the fire department to clear smoke from buildings in order to facilitate access to the fire and to aid in occupant evacuation. Preliminary studies have been conducted in multi-unit residential buildings but not in cold climates where stack effect may continue to dominate smoke movement. The research program is the result of a joint venture between CMHC, the City of Ottawa Fire Department and the Fire Laboratory of the Institute for Research in Construction of NRC. The ability of PPV to contain and clear smoke from exitways in high-rise buildings will be evaluated at the Fire Laboratory's full scale test building under both summer and winter conditions. If successful, PPV may offer Fire Departments an effective, lower cost, life and property saving tool.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1983 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ASSESSING THE PARAMETERS FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS

This research project will determine the ventilation requirements for apartments. Equipment and systems will be evaluated in their ability to meet such requirements in the context of building design, occupancy type and recent experiences in the application of ventilation systems in multi-unit residential buildings. Design and installation recommendations will be created for use by building designers. Technology gaps (e.g.; the absence of appropriate equipment) will also be identified for the benefit of future research and development efforts.

**CMHC Project Officer :** *Duncan Hill*

**CIDN :** 2271 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ASSESSMENT AND ALTERNATIVE APPROACHES FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS

The purpose of this project is to conduct a literature review, needs assessment and alternative approaches for ventilation systems in multi-unit residential buildings.

**CMHC Project Officer :** *Duncan Hill*

**CIDN :** 2271 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

### CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS

The objective of this project is to undertake a field investigation of the ventilation and infiltration in a residential high-rise building. CMHC, in cooperation with the Institute of Research in Construction, will monitor indoor-outdoor air pressure regimes in a high-rise for a period of one year. Ventilation system performance will also be assessed. Pressure regime measurements, in conjunction with measured air leakage characteristics of selected assemblies, will be used to estimate real-time air movement across the building envelope. This information will add to the body of knowledge governing infiltration-ventilation regimes and resultant heat load calculations in buildings.

**CMHC Project Officer :** *Duncan Hill*

**CIDN :** 1934 0200005

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



### CMHC GARBAGE BAG AIRFLOW TEST. ABOUT YOUR HOUSE; CE33

It is difficult for householders or small contractors to estimate airflows in the home. Suitable measuring equipment is not available for householder's use and the airflow test equipment available for contractors is relatively expensive and unwieldy. One alternative test method is to time the inflation of a garbage bag to estimate duct flow. The flow vs time characteristic was approximately established by CMHC research over ten years ago. This research has refined and extended the garbage bag air flow test procedure. This About Your House document has been prepared on how to do the test. The test, while somewhat crude, is a good indicator of flow for both householders and contractors.

*Ottawa: Canada Mortgage and Housing Corporation, 2001. 2 pages.*

Order Number: 62288

**STATUS :** Completed Fact Sheet

**AVAILABILITY :** CMHC Information Products and available on the Internet:  
<http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/index.cfm>

### DAWSON CITY DEMONSTRATION PROJECT - MONITORING

The objective of this project is to evaluate the state of the mechanical and monitoring system, conduct an on-site inspection in Dawson City and develop a proposal for monitoring and analysing the system's performance. Two houses were monitored over the past two heating seasons and the operating data is being analyzed.

**CMHC Project Officer :** Mark Holzman

**CIDN :** 1676 0300005

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### FIELD TESTING OF A POSITIVE PRESSURE VENTILATION DEVICE

A Positive Pressure Ventilation device, commonly used by fire departments for smoke control during fire emergencies, will be used to test the pressure and flow generating characteristics of the PPV fan system when used to pressurize a stairwell in a multi-unit residential building. The purposes of the test are twofold. First, the test will confirm the ability of the PPV equipment to generate sufficient pressures within the stairwell of an actual multi-unit residential building to prevent the proliferation of smoke into the stairwell from adjacent corridors. Second, the test will assess the ability of the PPV equipment to generate sufficient pressures to allow the equipment to be used for the purpose of determining air leakage characteristics of large buildings.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1983 0200003

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

## HEATING AND VENTILATION

### FIELD TESTS OF VENTILATION SYSTEMS INSTALLED TO MEET THE 1993 OBC AND 1995 NBC

This research looked at 49 new houses which had ventilation systems installed to meet the requirements of the 1995 National Building Code (as adopted by various provinces) or the 1993 Ontario Building Code. None of the houses met all the code requirements. The lack of compliance in Ontario and the Maritimes was due to equipment selection and installation that varied from code requirements. The Prairie houses also showed very high levels of potential house depressurization, which could lead to dangerous backdrafting and spillage of combustion appliances. Results from the 49 houses were outlined in the CMHC Research Highlight: Technical Series, no. 00-106. Since the field tests, there have been several attempts to propose changes to the National Building Code ventilation requirements, to avoid the problems identified in the survey, and a consensus was achieved in the spring of 2001. More field research is underway. Ten new Prairie houses will be built to the newly drafted code clauses in the fall of 2001. Testing will show whether the new clauses and the contractors interpretation of them leads to improved house ventilation.

**CMHC Project Officer :** Don Fugler

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** N/A

**STATUS :** Ongoing

\* NEW \*

### NORTHERN HEATING AND VENTILATION SYSTEMS

This is a continuation of related CMHC research which is of particular need to the North. Adequate, appropriate and affordable means of ventilation and verification of manufacturers' claims need to be assessed using established CMHC methodology. Results will be critical in alleviating costly health and building damage due to lack of confirmed ventilation options. The report will be complete in 2002.

**CMHC Project Officer :** Aleta Fowler

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2420 0200001

**STATUS :** Ongoing

### PERFORMANCE ASSESSMENT OF THE LEBRETON FLATS DISTRICT HEATING SYSTEM

The Lebreton Flats district heating system, installed 20 years ago, is one of few examples of low temperature district heating systems in North America. The availability of fuel consumption and maintenance records for the system allowed for an assessment of the performance of the system over the last 20 year period. Preliminary indications reveal that the plant provides space heating and hot water at a cost competitive with individual building systems but without the requisite building space. The distribution system was considered to be in good condition as minimal heat losses were noted. Recommendations regarding system performance, potential upgrades and future operation, maintenance needs and other ownership/management arrangements will be made in the final report.

**CMHC Project Officer :** Duncan Hill

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2134 0200001

**STATUS :** Ongoing

### REDUCTION OF AIR INTAKE CONTAMINATION OF HIGH-RISE RESIDENTIAL BUILDINGS

In the study, entitled, 'Reduction of Air Intake Contamination of High-Rise Residential Buildings', buildings will be tested to determine optimal placement of air intake grilles for HVAC systems. The placement determination will be based on water flume tests and modeling of air movement around high-rise buildings given confounding factors such as the height and proximity of neighboring buildings. A literature survey of relevant research on air intake grille location and contamination potential will also be performed.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2305 0200009

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### THERMOSTAT SETTINGS IN HOUSES WITH IN-FLOOR HEATING

This project surveyed 50 homes with hydronic in-floor heating and 25 control homes to determine if houses with in-floor heating have lower thermostat settings than those of houses with other types of heating systems. Lower home temperatures would reduce energy consumption. Sales literature for hydronic heating sometimes makes this claim. The field work revealed that houses with in-floor hydronic heating have thermostat settings similar to houses with other heating systems, and that there are no energy savings that can be attributed to lower thermostat settings for hydronic in-floor heating.

*Contractor: Jennifer Foote. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2001. (Research Highlights; Technical Series: 01-106) 2 pages*

*NOTE : Aussi disponible en français sous le titre : Réglage du thermostat dans les maisons dotées d'un plancher chauffant*

**STATUS :** New Completed Research Highlight

**AVAILABILITY :** CMHC Information Products and available on CMHC's web site

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

### BEST PRACTICE GUIDE - FIRE AND SOUND ASSEMBLIES FOR MULTI-FAMILY BUILDINGS

This document, targeted at designers of multi-family buildings, will provide the latest information on CMHC research into fire and sound partitions, floors, flanking, plumbing noise, etc. Construction details for fire and sound assemblies will be detailed. The document is being produced in collaboration with the NRC/IRC.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 1804 0200003

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## BEST PRACTICE GUIDE - WOOD FRAME ENVELOPES IN COASTAL CLIMATES OF BRITISH COLUMBIA

This project is revising the best practice guide - wood frame envelopes in coastal climates of British Columbia. A steering committee has been formed to recommend and evaluate the changes to the best practice guide. A consultant has also been retained to draft the changes. The changes have been received and have been circulated to the steering committee for approval. The new edition is now in production.

**CMHC Project Officer :** *Jacques F Rousseau*

**CIDN :** 2378 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## BEST PRACTICE GUIDE FOR CURTAIN WALLS

The objective of this project is to develop a practical, advisory document for designers, architects and engineers, and manufacturers, related to curtain wall systems in housing applications. The curtain-wall is a well developed system in commercial applications but it requires special treatment when used in housing. The project will be conducted in partnership with curtain wall manufacturers and installers and their associations. This Guide will be produced as a joint publication through a collaborative project with Public Works Government Services Canada. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to curtain walls, construction details in AutoCAD format, outline specifications and additional sources of information and references. The anticipated release date for the product is October 2002.

**CMHC Project Officer :** *Luis de Miguel*

**CIDN :** 2216 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## BEST PRACTICE GUIDE FOR EXTERIOR INSULATED FINISHED SYSTEMS (EIFS)

The objective of this project is to develop a practical, advisory document for designers, architects and engineers, and manufacturers, related to EIFS in residential applications. The project will be conducted in partnership with EIFS manufacturers and installers and their associations. This Guide will be produced as a joint publication through a collaborative project with the EIFS Council of Canada and the BC Wall and Ceiling Association. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to EIFS, construction details in AutoCAD format, outline specifications and additional sources of information and references. Anticipated release date is October 2002.

**CMHC Project Officer :** *Luis de Miguel*

**CIDN :** 2047 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## **BETH PROJECT: A BUILDING ENVELOPE TEST HUT IN COASTAL BRITISH COLUMBIA: FEASIBILITY STUDY**

A study was performed to determine the feasibility of an outdoor test facility for building envelope materials and components in Vancouver. Test facilities are useful for real-time, real-weather performance assessment of construction materials and assemblies. There are several such facilities in use around the world but none in a climate comparable to that of coastal British Columbia. The feasibility study included a review of existing similar facilities, determination of criteria for a successful Vancouver facility, investigation into research grant opportunities for funding the facility's construction, development of a conceptual design for the facility and its experimental capabilities in order to determine a cost target for fundraising, sampling of a pool of potential paying users of the facility, identification of possible sites and project custodians, and development of a project development plan. The study of Phase I of this work indicated that the concept for a Vancouver test facility is viable enough to warrant movement into the next phase of project development: handover to a project development team and initiation of fundraising. Phase 2 is underway.

*Prepared by Forintek Canada Corp. Prepared for Canada Mortgage and Housing Corporation and Homeowner Protection Office. CMHC Project Officer: Silvio Plescia. Ottawa: Canada Mortgage and Housing Corporation; Vancouver: Homeowner Protection Office, 2001. 49 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** On Loan from the Canadian Housing Information Centre

## **BETTER BUILDING GUIDE TO INNOVATION IN THE DESIGN AND CONSTRUCTION OF HIGH-RISE RESIDENTIAL BUILDINGS**

The objective of this project was to coordinate and edit the work relating to updating the "Better Building Guide to Innovation in the Design and Construction of High-Rise Residential Buildings" and to update the text, references and illustrations. The guide is designed for architects and other building design professionals.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 0840 0306020

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## **BREEAM GREEN LEAF ECO-RATING PROGRAM: CMHC MULTI-RESIDENTIAL BUILDINGS ASSESSMENT PILOT: FINAL REPORT**

There are many reasons for measuring the environmental performance of buildings, chief among them being that it can help building owners decide where to put their retrofit dollars to improve their buildings and reduce operating costs.

BREEAM/Green Leaf is an environmental assessment protocol that was developed in response to the need in the marketplace for a less expensive methodology that could be partially conducted in-house. This makes it an appropriate introductory whole-building, comprehensive energy and environmental assessment for managers of multi-residential buildings. The assessment is based on an investigation of building performance and management practices by use of a checklist and walk-through survey. The data is then used to generate a report, which provides a building rating and a list of recommendations to improve the building and management performance. The methodology originated in Canada and was developed by ECD Energy and Environment Canada and Terra Choice. It combined the BREEAM set of environmental issues with the Green Leaf Eco-Rating procedure.

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

CMHC commissioned the environmental assessment of six high-rise multi-residential buildings, using the BREEAM Green Leaf assessment methodology. The objectives of the pilot were:

- To find out how well the six buildings apply healthy housing principles.
- To obtain client feedback on environmental issues, including healthy housing principles.
- To obtain client feedback on the value of the environmental assessment.
- To find ways to better reflect healthy housing principles in the assessment methodology.

Six detailed, individual building assessment reports were undertaken. This report summarizes the results of the findings and the user survey.

*Prepared by ECD Energy and Environment Canada Ltd. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2001. 55 pages*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## BRITISH COLUMBIA HIGH-RISE ENVELOPE DETAILS STUDY

In recent years, there have been significant efforts to understand and resolve moisture ingress and deterioration problems associated with wood-framed, low-rise building construction. Currently, this problem is acute in some wood-frame condominiums in the Lower Mainland of British Columbia. There are indications that the high-rise stock may also be experiencing similar moisture problems. The objective of this project is to examine the files of a sample of approximately forty buildings to assess whether the high-rise stock in the coastal climate of lower mainland BC is experiencing significant moisture related problems. The project will not estimate the extent of a potential problem. The project will focus specifically on envelope details and envelope systems that have failed, rather than building failures. Envelope types and components under review will include window/wall assemblies and light-gauge steel stud (back-up) wall assemblies with stucco, masonry and EIFS cladding systems. The work is scheduled for completion in the fall of 2001.

**CMHC Project Officer :** Mark Salerno, Silvio Plescia

**CIDN :** 2234 0200

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Research Highlight is available

## BUILDING ENVELOPE REHABILITATION: CONSULTANT'S GUIDE and BUILDING ENVELOPE REHABILITATION: OWNER - PROPERTY MANAGER GUIDE

Many wood-frame buildings in B.C. have moisture problems -- and some have already been repaired once. Buildings that have never been rehabilitated and buildings that have been rehabilitated once will need work over the next few years. The fact that many buildings require a second rehabilitation emphasizes the need for the development of guidance with respect to effective rehabilitation measures.

The Owner-Property Manager Guide is intended to give owners and property managers a better understanding of the technical concepts and issues of rehabilitation. It is also intended to create a better understanding of the rehabilitation process. This improved understanding will help owners make more informed decisions, give property managers better guidance and create better communication among everyone involved in the rehabilitation of a building.

The Consultant's Guide has more technical detail than its companion volume listed above, and focuses more on the consultant's role in rehabilitation.



## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

These Guides deal with the repair and rehabilitation of building envelopes of multi-unit wood-frame buildings in the coastal climate zone of British Columbia. Much of the material in these Guides, particularly process-related information, may apply to other climate zones and building types. However, some analysis of the impact of different climate factors and specific building attributes must be considered before using the Guides.

*Prepared for Canada Mortgage and Housing Corporation by RDH Building Engineering Limited. CMHC Project Officers: Mark Salerno and Ken Ruest. Ottawa: CMHC, c2001.*

Order Number for Owner-Property Manager Guide (103 pages): 62307 \*\*Price: \$89.95 + GST and Handling Charges

Order Number for Consultant's Guide (177 pages): 62305 \*\*Price: \$129.95 + GST and Handling Charges

NOTE: Aussi disponible en français sous le titre : Réhabilitation de l'enveloppe de bâtiments : Guide des propriétaires et du gestionnaire immobilier et Réhabilitation de l'enveloppe de bâtiments : Guide du consultant

**STATUS :** New Completed Reports

**AVAILABILITY :** CMHC Information Products

### BUILDING FAILURES UPDATE 2000 - HIGH-RISE CONDOMINIUMS STUDIES

The purpose of this project is to provide CMHC with information (text, photos and drawings) to document building failures in high-rise condominium buildings in Ontario. The report will tabulate and compare findings from the CMHC/ONHWP 1990 document 'Construction Problems in Multi-family Residential Buildings'. No. 01-140 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

**CMHC Project Officer :** Luis de Miguel

**CIDN :** 1782 0300022

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Research Highlight is available

### CASE STUDY OF A SUCCESSFUL INNOVATIVE MULTI-UNIT RESIDENTIAL BUILDING: A COMPENDIUM OF RESEARCH OF THE CONSERVATION CO-OP BUILDING

In 1995, a multi-unit residential building, the Conservation Co-op, was constructed that embodied as many environmentally sound concepts and technologies as was possible within the confines of an extremely tight budget. The objective of the development team was to provide affordable housing with minimal environmental impact, enhanced durability and superior occupant health and comfort. After five full years of occupancy, Canada Mortgage and Housing Corporation initiated a review of the performance of the building, particularly with respect to energy and water consumption, indoor air quality and the operational experience with many of the "green" innovations included in the building. The review revealed that the enhanced insulation levels, high efficiency space and domestic hot water heating appliances, low E windows, and heat recovery ventilation were economically sound choices. It also illustrated the costs associated with continuous ventilation strategies and the need for more efficient fan-motor set technologies and distribution systems. Many of the "green" features met, or exceeded expectations while others failed altogether. Overall, the building is a successful project as it managed to incorporate many environmentally sound design and construction practices and its experiences are readily available to others considering similar projects.

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

This compendium contains the research projects conducted to assess the performance of the Conservation Co-op and the degree to which the original goals of the project were met. The research reports contained herein document annual operating energy and water use, embodied energy, and water reclamation efforts. The Compendium is prefaced with a summary paper that documents all of the innovative aspects of the building and provides an overview of the projects' successes and where improvements could be made. Further information is also available on the CMHC's web site [www.cmhc-schl.gc.ca/research/highrise](http://www.cmhc-schl.gc.ca/research/highrise) under the title Building Innovation.

Compiled by Duncan Hill, Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2001.

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA

The number and characteristics of condominiums in Canada are unknown. This project will review Statistics Canada data files to estimate the number of condominiums in Canada, their location, age, number of storeys and number of suites. This information will be used to supplement the CMHC Rental Market Survey in order to estimate the overall population of multi-unit residential buildings in Canada. This information will also be used to determine the data requirements for a database of multi-unit buildings that describes the physical characteristics and energy consumption patterns of this class of buildings. Such a database is necessary to establish energy retrofit guidelines for multi-unit residential buildings.

The review by STATSCAN has found that the number of condominium buildings in Canada may be determined through building permit information available from STATSCAN files since 1970. STATSCAN is in the process of compiling this information to estimate the condominium building population.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2277 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CONDITION SURVEY OF CONDOMINIUMS IN THE GREATER TORONTO AREA (GTA)

This project's objective is to carry out a condition survey of condominiums in the Greater Toronto Area. This project will be carried out in two phases. Phase 1 focuses primarily on data collection and development of research methodologies for examining topics related to both physical and social issues. Phase 2 focuses on conducting the surveys and completing the analysis of the state of repair of the buildings.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2161 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CONVERSION OF HIGH-RISE BUILDINGS TO RESIDENTIAL USE

The project will survey design and construction professionals and property managers of existing converted buildings across Canada to determine the extent and nature of technical problems which were encountered in the design and construction phases of the conversions; to determine the perception of property managers as to the concerns of the occupants; to determine the technical problems which have arisen as a result of these conversions; and to determine if there were any attempts to improve energy use performance or to introduce features to improve the sustainability of these buildings. Selected buildings would be documented as case studies in CMHC's Better Buildings/Innovative Buildings information series. The research report on this study is expected to be completed in 2001.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2242 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CONVERSION OF NON-RESIDENTIAL BUILDINGS TO MULTI-RESIDENTIAL USE

This cross Canada study is investigating the technical problems relating to the conversion of non-residential buildings to residential use. It will also address the issues which influence affordability in conversions to affordable housing indicating their potential to impede or encourage this housing. Case studies will be developed to show how these technical issues were overcome, with cost breakdowns.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2242 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## DEVELOPMENT OF A CEMENT STRESS-SKIN EPS-CORE BUILDING SYSTEM

This project's objective is to verify the performance of a composite wall in order to determine if it is safe for use in ancillary and residential buildings.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2437 0200011

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

## DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR)

A database structure to house building characteristics, energy and water usage data for multi-unit residential buildings has been completed. The database, known as HiSTAR (High rise building Statistically Representative Database) is in MS ACCESS format. The database will be used to compile and analyse building energy and water data collected during CMHC's research projects which take consultants into high-rise residential buildings. The HiSTAR database will be used to generate fact sheets on energy and water use and will be used for the analysis of the potential impact of energy and water efficiency upgrades.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2366 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***



## DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR) TASK 2: COLLECTION OF ADDITIONAL BUILDING FILES FOR THE HISTAR DATABASE

CMHC has commissioned a research project to gather information to characterize the energy and water consumption patterns in multi-unit residential buildings. This data will be used to supplement the data contained in the CMHC HiSTAR database. The HiSTAR database is used to baseline water and energy use in multi-unit residential buildings and is also used to evaluate the impact of building and occupancy characteristics and location on energy and water use.

**CMHC Project Officer :** Duncan Hill

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2366 0200002

**STATUS :** Ongoing

**\* NEW \***

## ENVELOPE DRYING RATES EXPERIMENT: FINAL REPORT

The design and construction of building envelopes must be based on the assumption that some moisture will accumulate in the wall assembly, during construction and during the life of the building. Construction practices for multi-unit wood frame residential buildings in the coastal area of British Columbia, Canada are changing in response to a large number of envelope failures experienced in the period from 1985 to 1999. The new design approach includes the use of enhanced deflection and a drained cavity. While this approach will manage a large portion of the exterior moisture load, designs may also need to incorporate enhanced drying capabilities. A research program conducted at Forintek Canada Corp.'s western lab in Vancouver, Canada has evaluated the relative drying rates of wall assemblies under controlled laboratory conditions. The research ranks test wall panels in terms of their relative drying capacities, identifies potential wall locations at greater risk of slow drying (thus requiring enhanced material durability) and derives baseline data which can be used to improve parametric models of wall performance.

Results from the first group of 12 wall panels tested indicate that all the panels dried. There was a substantial range in drying rates, with ratios up to 3 times for comparable wall panels with and without a cavity. The major influences on drying rates were:

- The presence of a wide cavity (the 19 mm cavity performed better than either the 10 mm cavity or the 0 mm cavity);
- The choice of venting (top and bottom venting had a marginal improvement over venting at the bottom only);
- The choice of sheathing (plywood sheathed panels dried faster than OSB sheathed panels, partly because the plywood started out at a higher moisture content).

There was no clear indication that the choice of moisture barrier material had a substantial influence on drying.

The results of the test were compared to predictions made by CMHC's WALLDRY model. The WALLDRY parametric model demonstrated good predictive capabilities in terms of overall drying trends.

The first EDRA test has set a "benchmark" drying rate of 1600 ng/pa.sec.m<sup>2</sup> for the effective permeance of the 'best drying' panel in the test group.

*Prepared on behalf of Forintek Canada Corp. by Don Halzleden, House Works Building Science Inc.  
Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officers: Silvio Plescia and Mark Salerno. Ottawa: CMHC, 2001. 1 CD-ROM*

**STATUS :** New Completed CD-ROM

**AVAILABILITY :** Canadian Housing Information Centre

## FIRE AND ACOUSTICAL PERFORMANCE OF FLOOR ASSEMBLIES - PHASE II

A continuation of an earlier project, this phase will be carried out over 4 years with a total budget of \$2.2 million. A dozen industry and government partners have formed a consortium with the National Research Council of Canada to complete testing of several types of assemblies for residential construction. Results will be incorporated in the National Building Code of Canada. Both full and small scale fire and sound testing will be carried out. A large database will be developed which designers and builders can use for reference. Particular attention will be given to assemblies likely to just obtain an STC 50 rating.

**CMHC Project Officer :** *Luis de Miguel*

**CIDN :** 2375 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS

Investigations of previously retrofitted solid masonry walls have been performed to determine the impact that the interior application of insulation has on the durability of the walls. The findings of the investigations will be published as case studies. Case studies will include a 120 year old solid masonry building in Montreal that was insulated 15 years ago by the application of spray applied polyurethane insulation on the interior of the walls, a 50 year old solid masonry office building in Ottawa that was insulated on the interior 8 years ago and several 1900's vintage apartment buildings in the Ottawa area. Preliminary indications are that the interior application of insulation has not adversely affected the durability of the masonry walls of the case study buildings but further investigation will be required to confirm that this conclusion generally holds true for other buildings.

**CMHC Project Officer :** *Duncan Hill*

**CIDN :** N/A

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

## IN-SITU MONITORING OF EXTERIOR WALL ASSEMBLIES - MONTREUX RESIDENCES

This project's objective is to monitor the performance of the exterior wall assemblies at the building complex, known as Montreux Residences, for temperature, relative humidity, moisture content and air pressure differentials.

**CMHC Project Officer :** *Silvio Plescia*

**CIDN :** 2254 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## IN-SITU PERFORMANCE OF THE EXTERIOR WALL SYSTEM

The objective of this project is to monitor, assess and document the performance of a residential low-rise, wood-framed development which incorporates rainscreen design technology, to analyze data to determine the effectiveness of wood frame rainscreen wall assemblies and to identify the relative performance of building envelope features that provide improved performance or minimizes the risk of envelope problems.

**CMHC Project Officer :** *Silvio Plescia*

**CIDN :** 2254 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING

This project will describe load profiling work underway in Metro Toronto Housing Corporation multi-unit residential buildings. The project will characterize thermal, electrical power and water requirements in the apartment buildings and will also identify technical issues encountered in load monitoring and data interpretation. This project is being used as a pilot project to identify the factors that will have to be considered in a larger project being planned by CMHC and Natural Resources Canada to assess the energy and water load profiles in low and high-rise housing.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2201 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS

The purpose of this project is to develop knowledge to assess the impact of various wall design and indoor-outdoor environmental conditions on the durability and energy efficiency of new and retrofitted high-rise residential and commercial building systems. The hyglRC heat, air and moisture model developed by the Institute for Research in Construction is being used to model common wall systems. Retrofits to improve the airtightness and insulation levels in the walls were developed and are being applied to the basic wall systems. The hyglRC model will simulate heat, air and moisture conditions within the retrofitted walls to determine how the retrofits affect the durability of the wall system. This information will be used as a means to confirm the integrity of several specific retrofit measures developed for high-rise wall structures before they are recommended to the building industry.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1934 0200003

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### MONITORING INNOVATIVE MECHANICAL AND ELECTRICAL SYSTEMS

The innovative mechanical and electrical energy producing systems in a multi-unit residential buildings project in Toronto were monitored and assessed to determine their economic viability. The project involved the assessment of the buildings cogeneration, space heating, absorption chilling, domestic hot water and ventilation systems and a review of natural gas and electricity use. The cost of energy provided to the building by the cogeneration system in terms of fuel consumption, maintenance expenditures, avoided electrical use and other considerations was determined. An inspection of the individual space conditioning systems within the suites was also performed. The findings of the investigation showed that the operation costs (fuel use, maintenance and repair) of the cogeneration system was not economically viable. Key findings include the observation that the system was not making full use of the heat generated by the cogeneration systems. The report estimated that even if all of the heat was recovered from the cogeneration system, the benefit of the system to the building's owners would be marginal. Given that the building embodies some of the most advanced technologies that allow for energy efficiency, cascading and recovery, operation costs should have been low relative to conventional buildings.



CMHC coordinated a meeting of the project developer, engineering design team, cogeneration system manufacturer, utility representative and industry experts and stakeholders to review the situation in the building and to determine whether or not the performance of the building systems could be improved. The outcome of the meeting was that a review of the utility meters and billing history should be undertaken to confirm that the basic information being used to assess the performance of the building is correct. CMHC is working with Ontario Hydro Energy and Admic Controls to develop a metering review plan and evaluation.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1260 0800001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### MONITORING THE PERFORMANCE OF AN EIFS RETROFIT ON A 15 STOREY APARTMENT BUILDING

Morrison Hershfield Limited was retained by Canada Mortgage and Housing Corporation to monitor the performance of the rehabilitation of a 15-storey, 112-unit apartment complex located in Toronto. A major phase of the rehabilitation involved installation of exterior insulation and finish system (EIFS) rainscreen cladding over the existing brick masonry walls. The monitoring program included analysis of temperature, moisture content and air pressure measured at five locations over a winter season.

The original wall construction was clay brick masonry with concrete block backup, expanded polystyrene insulation, and plaster interior finish. The EIFS cladding consisted of acrylic stucco lamina installed over expanded polystyrene insulation that was adhered to the brick masonry using a trowel-on, proprietary material. The trowel-on material was intended to function as the air barrier and drainage plane. Vertical channels, which were located on the interior face of the insulation, were intended to drain rainwater that penetrated to the coating through drain blocks located every 5 stories.

The project objectives were:

1. To document the development of a building envelope retrofit strategy for a residential high rise building.
2. To monitor, assess and document the performance of a residential high rise building envelope retrofit.
3. To assess the degree to which the monitoring protocol can be implemented as part of regular operation and maintenance activities for new and existing buildings.
4. To assess the potential for the development of a commercially viable, building envelope performance monitoring protocol.

The objective of the monitoring program was to establish the performance of the retrofit wall with respect to heat, air and moisture control.

*Prepared by Morrison Hershfield Limited. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2000. (70 pages)*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## OPERATION AND MAINTENANCE GUIDES FOR MULTI-UNIT RESIDENTIAL BUILDINGS

Two publications, currently in 'draft' stage, on improving the operating performance of modern residential building systems have been developed. The first document, for owners and managers, links good operating practices with desirable investment strategies. The second, for building operating and maintenance staff, updates information on mechanical and electrical systems and incorporates preventative maintenance checklists for multi-unit residential buildings. CMHC will be updating the guides, revising the language and will be adding healthy housing components to the guides prior to publication.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1774 0300004

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PERFORMANCE MONITORING OF A BRICK VENEER/STEEL STUD WALL SYSTEM: PHASE 4 RESULTS: REVISION I

The Brick veneer/steel stud (BV/SS) wall system has become very popular over the last 20 years, however, the rapid adoption of this wall system has preceded the development of adequate design and construction standards. This situation has led to concerns regarding the long term safety, serviceability and durability of BV/SS wall systems. Therefore, Canada Mortgage and Housing Corporation (CMHC) has been evaluating BV/SS wall systems over the past several years by commissioning studies by various consultants, including Keller Engineering Associates Inc. (KEA).

Phase 4 of this study by KEA involved a fourth year (in 1996 and 1997) of in-situ performance monitoring of a BV/SS wall system, with respect to air and moisture movements as well as temperature gradients. In an attempt to improve venting of the wall cavity, vent holes were cut into every second vertical mortar joint in the top course of the monitored brick veneer section. The performance of a test wall was monitored using various temperature, moisture and air pressure sensors that were connected to an automatic data logging system. Even though the BV/SS wall system is typical of current practices and workmanship was mostly satisfactory, the results of the study demonstrate that performance problems exist that may lead to significant distress over the long term. The more serious performance problems identified in this study are mainly due to design weaknesses, illustrating the need for improved design and construction standards.

*Prepared by Keller Engineering Associates Inc. CMHC Project Officer: Jacques Rousseau. Ottawa: Canada Mortgage and Housing Corporation, December 1999. (69 pages)*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## QUALITY ASSURANCE PROTOCOL TEST DRIVE

"Quality by Design" was commissioned as the Quality Assurance Protocol by Canada Mortgage and Housing Corporation in order to establish a management system for the assurance of quality of the exterior of multi-storey wood frame buildings located in the coastal climate of British Columbia. This is part of the initiatives undertaken by the Building Envelope Research Consortium, of which CMHC is a member, to address the "leaky condo" issue as it pertains to new construction. A Quality Assurance Protocol is a set of recommendations and guidelines which, if followed, will assure an improved level of quality in design, construction and maintenance.

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

The original "Quality by Design" was published in January 1999. This current edition has been refined extensively based upon ongoing input from a wide variety of sources, and in particular, the document has been refined based upon applying it to a real project.

*Prepared by Pro Pacific Architecture Limited. Principal investigators for the project were Brian Palmquist and William A. Gies, assisted by quality systems consultant Arc Rajtar. The "test drive" revisions were prepared by Brian Palmquist. CMHC Project Officers: Jacques Rousseau and Mark Salerno. Ottawa: Canada Mortgage and Housing Corporation, c2000.*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### RAIN PENETRATION CONTROL: APPLYING CURRENT KNOWLEDGE

Water is the most significant factor in the premature deterioration of buildings. It can damage some materials directly and reduce the effectiveness of insulation. It is the major factor in the corrosion of metals, the chemical breakdown of many organic materials and the growth of mold and rot. Controlling water penetration, as well as its location, duration and phase (vapour, liquid or solid), is often the most critical factor in achieving long-term performance of a building envelope assembly.

This document focuses primarily on rain penetration control in walls and windows. Other wetting mechanisms include condensation and exposure to ground water. Moisture can be removed from a building assembly through drainage, by diffusion or venting (convective air change) to a drier indoor or outdoor environment. Most building assemblies and materials have some tolerance for infrequent and short duration wetting. Some infrequent passage of water to the inside is a minor inconvenience rather than a disaster. Determining how much effort and expense can be justified to minimize water penetration or evaluating what assembly types are appropriate for a particular building application and location is an exercise in judgment and risk management.

Following a discussion of several approaches to water penetration control in walls, including architectural design, there is a detailed explanation of the rain-screen principle and its application to contemporary buildings. Designers are further challenged to incorporate the Pressure Equalized Rain-screen (PER) principles. The PER system uses compartment seals to divide the cavity into a series of chambers in addition to the elements of a simple rainscreen. This limits lateral air flow in the cavity and increases pressure equalization, ultimately reducing the amount of water entering the interior wall. Remarkably, in pressure equalized rainscreen walls or joints, leakage is reduced by making bigger holes in the outside surface. This is counterintuitive.

To help design rainscreen curtain walls CMHC developed the "RainScreen" software. It allows designers to vary the parameters of their rain screen system and graphically see the resulting dynamic pressure distribution on cladding and air barrier (backpan) layers. Its mathematical engine is based on the CMHC report "Rainscreen" by Jacques Rousseau. "RainScreen 2.1" adds many new features and an easy GUI interface, using either Windows (3.1 or 95) or Macintosh systems.

The "RainScreen v2.1" software may be downloaded free from CMHC at:  
<http://ftp.cmhc-schl.gc.ca/highrise/rainscreen.html>.

Ottawa: Canada Mortgage and Housing Corporation, 2001, c1999.

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



## REPAIR AND RETROFIT CASE STUDIES FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is documenting repair and retrofit activities in multi-unit residential buildings. The first 30 case studies, available on our web site under the title: "Better Buildings", document building characteristics, the type of problems that prompted the repairs and retrofits, costs, benefits, etc. A wide range of case studies are included to reflect regional repair and retrofit priorities. The studies are useful for other members of the multi-unit residential building industry to refer to when considering similar projects.

**STATUS :** Completed

**AVAILABILITY :** Available on CMHC's Web site: [http://www.cmhc-schl.gc.ca/en/burema/himu/bebufa/bebufa\\_021.cfm](http://www.cmhc-schl.gc.ca/en/burema/himu/bebufa/bebufa_021.cfm)

## REPAIR AND RETROFIT CASE STUDIES OF THE LOFTS CORTICELLI COMPLEX

A field project to review the condition of the solid masonry walls of a historic building in Montréal has been completed. The building, originally constructed in the 1800's, was converted to residential use in 1986. As a part of the renovation, the interior of the solid masonry brick walls was insulated with spray applied polyurethane foam and fibreglass batt insulation. As this type of insulation retrofit was thought to be responsible for the deterioration of solid masonry walls, CMHC initiated a project to assess the condition of the building envelope and all of the elements. The field survey found that the walls, after 14-15 years of service, were in good condition. No conditions or symptoms were found that would lead to the conclusion that the application of the spray applied polyurethane foam and other finishing materials had, in anyway, undermined the integrity of the wall system. This finding is important as many older buildings in the urban areas of Canada are being renovated to residential use and exterior insulation retrofits are not possible for heritage or aesthetic reasons. While the finding of this study is specific to this one building, it appears that interior insulation wall retrofits may be possible as long as steps are taken to prevent the intrusion of moisture and air leakage from both interior and exterior sources into the wall assembly. Susceptible wall members, such as embedded wood structural members should be protected as well. CMHC will perform additional case studies of retrofitted solid masonry walls to provide a better understanding of the strengths and weaknesses of this form of renovation.

**CMHC Project Officer :** Duncan Hill

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 1782 0300020

**STATUS :** Ongoing

## TECHNOLOGY ROAD MAP FOR INTELLIGENT BUILDING TECHNOLOGIES

The objective of this project is to develop a road map for intelligent building technologies, considering the potential technological, societal and other developments that will affect the industry within the next five years.

**CMHC Project Officer :** Sandra Marshall

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2388 0200001

**STATUS :** Ongoing

## HOME OWNERSHIP

### TECHNICAL ASPECTS OF SELLING NEW HOMES

The purpose of this initiative was to support a project being managed by the Professional Home Builders Institute of Alberta (PHBIA) which was to develop a 12 to 18 hour interactive CD-ROM course on "The Technical Aspects of Selling New Homes". The CD-ROM course is based on two existing courses and includes video clips, audio, graphics, text, self-tests and optional exams. The information contained in the CD-ROM is beneficial to home builders' new home sales staff, and to real estate sales agents who are involved in selling new homes. Also, new home buyers can take the course to raise their awareness of the home buying process. The CD-ROM can be used as an ongoing reference.

**STATUS :** New Completed CD-ROM

**AVAILABILITY :** For more information, or to order a copy of this CD-ROM, please contact the Professional Home Builders Institute of Alberta at (403) 216-8310 or by e-mail at [phbia@phbia.com](mailto:phbia@phbia.com)

## HOUSE CONSTRUCTION

### ALTERNATIVE WALL SYSTEMS FOR LOW-RISE RESIDENTIAL CONSTRUCTION

The purpose of this study is to research ten alternative wall systems for low-rise housing in use today. These systems will include insulated concrete forms, straw bale, structural insulated panels, stack wall, concrete block, post and beam, log, earth construction, manufactured wood, and lightweight steel. The results of this study will be beneficial to those in the industry to help them make better informed decisions on choices between alternative systems. This study will take an inventory of and investigate the differences, benefits and limitations of the various building systems which are currently in use as compared to the typical wood-frame, stick-built construction of low-rise housing. It will consider the benefits and drawbacks of the various systems. The study will examine a number of the factors to be considered by a builder or homeowner to help them understand the differences between the available system choices so they may evaluate and select systems appropriate to their clients, house designs, trade practices and skills, and regions. The study will include reviews by representatives for each of the wall systems. The anticipated completion date is late 2001.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2119 0200

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### BUILDING ENVELOPE SOLUTIONS - THEORY AND PRACTICE

This is a partnership project between the Canadian Home Builder's Association of British Columbia (CHBA/BC), the Homeowner Protection Office (HPO) of B.C. and CMHC. The purpose of the project, previously called "Builders ToolBox", is to develop a course curriculum and course training materials to train general contractors and subtrades in building construction practices that would enable them to construct highly durable building envelopes for new residential wood-frame buildings located in the lower mainland of British Columbia and Vancouver Island and to restore and upgrade the envelopes of existing buildings. The end product will be a Trainer's Manual complete with all the necessary training aids, and a Participant's Manual. The course will be tailored to meet the needs of the residential construction industry and would use a full range of teaching methods to ensure that all participants absorb the information provided. The course development is expected to be completed and pilot testing started by Fall 2001. The course pilot will consist of three seminars over a six month period with up to 25 participants per seminar. CHBA-BC will be granted the exclusive right to deliver this course in the province of BC for a two year period.

# HOUSE CONSTRUCTION

**CMHC Project Officer :** Darrel Smith, Mark Salerno

**CIDN :** 2287 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CD-ROM VERSION OF THE CANADIAN WOOD-FRAME HOUSE CONSTRUCTION

The purpose of this project was to design and develop a CD-ROM version of CMHC's Canadian Wood-Frame House Construction (CWFHC) publication complete with a number of multimedia enhancements and other special features such as video clips, animations and 4D illustrations. The CD ROM includes a number of "calculators" to help the user determine the specified snow loads for specific locations across Canada, and to select proper beam and joist sizes and spacings. It also includes the Glossary of Housing Terms with links to and from the text and illustrations in the Canadian Wood-Frame House Construction, to serve as an illustrated glossary. Other features of this product are:

- It is a web-based interactive CD-ROM;
- A full-text search engine allows the user to search for any term;
- Planning ahead and checking back notes appear throughout the text with links to illustrations and video footage;
- It is based on the National Building Codes; and
- It contains 144 high quality illustrations that can be optimized for printing.

The CD-ROM system requirements are as follows:

### For PC:

i486 , Pentium  
Microsoft Windows 95/  
Windows NT 4.0  
32 MB RAM  
12 MB hard-disk space  
Netscape 4x or Internet  
Explorer 4x  
Adobe Acrobat Reader Version  
4.0  
Apple QuickTime 4.0  
Microsoft Excel 97®

### For Mac:

Macintosh PowerMac G3  
Macintosh System OS 7.5  
64 MB RAM  
Netscape 4x or Internet  
Explorer 4x  
Adobe Acrobat Reader  
Version 4.0  
Apple QuickTime 4.0  
Microsoft Excel 98

The CD ROM is now available separately or packaged with a hard copy of the CWFHC.

Order number for CD-ROM only: 62237;

Price: \$64.95 + GST and handling charges

Order number for CD-ROM and Guide: 62234

Price: \$84.95 + GST and handling charges

By purchasing the CD-ROM + Guide package:

You will save \$5.00 off the price of purchasing them separately; and  
Have the guide as a handy on-site reference

For clients who wish to demo the product, they may call to receive a copy of the Canadian Wood-Frame House Construction demo CD-ROM.

**STATUS :** Completed CD-ROM is available

**AVAILABILITY :** CMHC Information Products



## COMPARING THE PERFORMANCE OF TWO-COAT VS THREE-COAT STUCCO

CMHC through its Prairie and Northwest Territories Business Service Centre in Calgary is supporting this Alberta Housing Industry Technical Committee (AHITC) research project. The research will use laboratory and field testing to compare the performance of two coat stucco commonly used in the Prairies and standard three coat stucco. If they perform similarly, building code changes may be recommended. The effects of stucco additives and mixtures will also be examined. Currently the contractor has completed the review of test procedures and has drafted the laboratory work report. The field work that follows will involve testing samples of two-coat stucco removed from existing houses to verify their performance.

**CMHC Project Officer :** Don Fugler, Colin Crumb

**CIDN :** 2399 0200

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## DEVELOPMENT OF AN INSTRUCTOR'S GUIDE AND AN ACCOMPANYING PRESENTATION FOR RESIDENTIAL GUIDE TO EARTHQUAKE RESISTANCE

The objective of this project is to develop a course to advocate the importance of, and to convey knowledge on making houses more resistant to earthquakes. There will be two courses developed. The first one, which will be developed in partnership with the British Columbia Institute of Technology (BCIT), will be approximately 18-24 hours in length and will be targeted to designers, builders and renovators. It will cover information on construction techniques to better prepare housing to withstand an earthquake. The second course, which will be developed in-house by CMHC staff from the long course, will be approximately 6 hours and targeted to a general audience of consumers. It will address consumers' concerns regarding the durability of their housing during disasters. The development of the industry course is currently underway and is expected to be delivered through BCIT this Fall.

**CMHC Project Officer :** Darrel Smith, Mark Salerno

**CIDN :**

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Seminar/training is not yet available \* **NEW** \*

## FEASIBILITY OF DEVELOPING A BUILDING CANADA PROGRAM

The purpose of this project is to examine the feasibility of developing a Building Canada program similar to the Building America model. To be effective, the Canadian program needs to be of interest to Canadian builders and recognize the different environment by responding to their real needs, i.e., reducing construction costs, customer callbacks, warranty claims, construction time, and construction waste, while at the same time improving the energy efficiency of their new houses. The program will result in little or no additional cost for the builder and wherever possible a reduction in costs. This study is a necessary first step to determine if a Building Canada program is viable and could be established in Canada. It will draw from the experience of the Building America program as well as the results achieved in a pilot of this program with two large Canadian builders. This project will be managed by EnerQuality Corporation on behalf of a consortium of partners including; CMHC, Enbridge Consumers Gas, Union Gas, Owens Corning, Natural Resources Canada, and the National Research Council (through its Industrial Research Assistance Program). Once this initial program design phase has been completed, and if found feasible, the program will be launched and expanded as part of subsequent phases.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2387 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

\* **NEW** \*

### FEASIBILITY STUDY ON THE DEVELOPMENT OF A COMMISSIONING GUIDE FOR NEW HOUSES

The purpose of this project was to assess the importance and determine the feasibility of developing a commissioning guide for builders and buyers of new houses. The research indicated that generally home builders do not currently carry out a whole house commissioning and do not have a protocol to do so. However with houses becoming more complex, there is greater need to have a competent person investigate the whole house and all its systems to ensure they are installed and functioning as originally designed before delivery to the buyer. To be effective and useful, the commissioning guide must be simple to use and yet comprehensive. It must not add significantly to the cost of the house. Commissioning should not be a duplication of services already in place. The guide should include a review of the installation and operation of all major components and systems of the house. The study found that the benefits of the house commissioning process are that:

- houses perform better
- homeowners are assured the house is built as expected according to the plans and specifications and the components and systems have been installed and are functioning properly
- homeowners are better informed about the systems in their houses and how they work (resulting in less call backs for contractors), and
- potential problems are identified before damage occurs (also resulting in less call backs for contractors and reduced costs for warranty programs)

The study identified a need and found interest by clients and stakeholders in the development of a commissioning guide. As a result, CMHC is considering the development of a commissioning guide.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2360 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### FEASIBILITY STUDY: DEVELOPING A GUIDE FOR ENGINEERED WOOD I-JOIST FLOOR SYSTEMS

The purpose of this project was to confirm the need for and determine the feasibility of producing a generic guide for builders on the selection and proper installation of engineered wood I-joist floor systems. Overall, there was strong support from the various stakeholders for the development of a generic I-joist guide. The strongest support came from building officials across the country. Building officials see the guide as something that could inform not only the framing crews but also the sub-trades who occasionally damage the products. I-joist manufacturers support the development of a guide, however, they do not think it should include performance aspects such as spans and floor load tables. According to builders, the guide should contain as many details as possible, but at minimum details on nailing patterns for double joists, rim joists, stair openings, flue box, and cantilevers. Based on stakeholder input, the guide should cover:

- general I-joist information;
- special design and installation considerations;
- generic details;
- proper use of framing hardware and blocking; and
- storage and handling recommendations.

CMHC is considering the development of this guide. Potential interested partners will be approached.

*Prepared by Buchan, Lawton, Parent Ltd. CMHC Project Officer: Darrel R. Smith. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2001. 76 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## HOUSE CONSTRUCTION

### RESEARCH ON SOLUTIONS TO PYRITE-RELATED BACKFILL EXPANSION PROBLEMS

This study will draw up an inventory of the problems associated with the reactions of the pyrite (iron sulphide) contained in the backfill stone used under slabs in residential properties. Two hundred houses inventoried in three Montréal South-Shore municipalities will be visited under the CTQ-M200 protocol developed as part of the work of the Quebec technical committee on pyrite-related problems. The results of the study will identify possible causes and potential affordable solutions. The objective is to provide the industry with a more global vision of this new situation.

**CMHC Project Officer :** *Jacqueline Meunier-Bureau*      **STATUS :** Ongoing  
**Division :** Research Division      **AVAILABILITY :** Product is not yet available

### WOOD USE STUDY IN STRAW BALE BUILDING

This is another in a series of small projects assessing the acceptability of straw bale walls for housing. The contractor will sum up all the wood used during the construction of his straw bale building, and then compare the wood use to a simulated, conventional building of the same size and design. Straw bale buildings are always touted as being environmentally sound for their reduction of wood used; this project will attempt to establish and quantify that reduction.

**CMHC Project Officer :** *Don Fugler*      **CIDN :** 2441 0200001  
**Division :** Research Division      **STATUS :** Ongoing  
**AVAILABILITY :** Product is not yet available      **\* NEW \***

## HOUSE CONSTRUCTION INDUSTRY

### TECHNOLOGY DISSEMINATION: TRIGGERING INNOVATION ADOPTION IN CANADA'S HOME CONSTRUCTION INDUSTRY

Cost saving technologies are often slow to be adopted in Canadian house construction. This may be due in part to most contractors having limited abilities to undertake research and evaluation, and develop the competency to use such advances. The goal of this External Research Program work was to devise an information dissemination technique which focuses on the process of innovation introduction rather than the innovations themselves. It is felt that by "reasonably demonstrating" the value of various innovations to subcontractors, there will subsequently be a "natural" spread to other projects as the subcontractors utilize their newly acquired cost-effective techniques to gain a competitive advantage. The work includes a discussion of a literature review and the identification and selection of innovation technologies. This project report will be of interest to researchers, builders and developers who wish to integrate new and improved building process onto the mainstream of the construction industry.

*Prepared by B. Ian Bazley. CMHC Project Officer: Thomas Green. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2001. (External Research Program Report) 113 pages*

**STATUS :** New Completed Report  
**AVAILABILITY :** Canadian Housing Information Centre  
**\*\* SEE ALSO:** p. 91- 92



## HOUSING DESIGN

### DESIGN MULTIPLE-UNIT CHUM'S AND MODULAR HOUSE PACKAGES FOR URBAN AND SUBURBAN, REMOTE AND NORTHERN COMMUNITIES

The purpose of this project is to support the preparation of design drawings, construction specifications and cost estimates for several Multi-Unit CHUM's (Containerized Heat and Utilities Modules), and for matching Modular House Designs that would integrate with these CHUM's, specifically for the suburban and rural, remote and northern communities contemplated. The project is about 60% complete - a draft version of a design manual has been produced in both a printed format and as a CD-ROM. The project has been delayed in part due to difficulties in establishing candidate sites for demonstration and/or commercial application. The manufactured housing industry has been a key participant/supporter of this project.

**CMHC Project Officer :** Chris Ives

**CIDN :** 2407 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

### MONTREAL: A GREAT TRADITION OF MEDIUM-DENSITY HOUSING

This project aims to highlight the adaptation processes of housing and building types throughout the various phases of the evolution of "plex" formulas (duplex, triplex, fourplex, fiveplex ...) in Montreal over two construction cycles between 1866 and 1900.

**CMHC Project Officer :** Brian Eames

**CIDN :** 1455 0200001

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## INDOOR ENVIRONMENT

### DEFINING THE CONVECTIVE DRIVING FORCE FOR SOIL GAS INTRUSION INTO HOUSES: FINAL REPORT

The objective of this project was to evaluate soil gas pressures surrounding building envelopes, taking into account the role of geological variability, surface covers, and other environmental factors. The data gathered will be used to predict soil gas flux into houses and its effects on indoor air quality.

The project was carried out in two phases. In the first phase, soil gas pressures around and across the basement envelope were monitored at five different sites for a minimum period of six weeks. Houses at two of the five sites did show high soil gas pressures developing under certain climatic conditions. Following this work, a new mathematical model was developed to augment the current models in the literature. The new model was aimed at defining the rate of soil gas influx in situations where variations in the stratigraphy could cause increased convective transport. The computer model developed for this project was able to simulate soil gas entry.

*Prepared by adomait Environmental Solutions. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2001. (External Research Program Research Report) 137 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### DEPRESSURIZATION TESTING OF SPILLAGE-RESISTANT APPLIANCES

This project involves field testing of the installed performance of 100 appliances that are theoretically 'spillage-resistant', to see if they function satisfactorily under high levels of house depressurization. The work is underway with a contractor in the Peterborough area. If a significant number of the 100 appliances fail at low depressurizations, then the project will proceed to a laboratory testing phase. If the appliances generally function well at 50 Pascals of house depressurization, no further testing will be undertaken.

**CMHC Project Officer :** Don Fugler

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2492 0200001

**STATUS :** Ongoing

**\* NEW \***

### DEVELOPMENT OF A PROCEDURE FOR ESTIMATING AIR CHANGE RATES USING A SPECIFIC ODOUR AS A TRACER GAS

When householders complain about poor indoor air quality or high energy costs, the rate of outdoor air infiltration is critical in analyzing their problem. If the rate is very high, this could lead to high heating costs. If the rate is low, poor air quality may result and adding a ventilation system would be useful. However, there is no simple quantitative way for residents to estimate ventilation rates in their own house. This research project aimed at developing a procedure for estimating of air change rates, using a specific odour as a tracer gas. The research has not been particularly successful. The contractor selected a convenient and available odour source, wooden matches, but their usage as a whole house test procedure turned out to be impractical. They may be more suitable for room air change testing. Further testing is required (but not planned) in order to evaluate the use of odours to determine air change rates in small spaces.

**CMHC Project Officer :** Don Fugler

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2396 0200002

**STATUS :** Ongoing

### HEALTHY INDOOR ENVIRONMENTS PHASE 2: CONSULTATION PROCESS

This is the second phase of the project "Towards the Use of Voluntary Initiatives for Achieving Healthy Indoor Environments in Canada" which was a 1998-99 partnership project led by Pollution Probe Foundation in which CMHC participated. Recommendations from the initial report include the development of a comprehensive multi-stakeholder strategy to address the Canadian indoor environment issue. This Phase 2 work, led by Pollution Probe in partnership with a number of government and industry stakeholders, involved the hosting of three regional consultations (Toronto, November 2000; Halifax, January 2001; and Vancouver, March 2001) and a web based database discussion forum. The objective of phase 2 is to develop a vision of what is possible in the field of healthy indoor environments, a strategy to achieve it, and multi-stakeholder commitment to realize that strategy. The project has been completed and the final report will be available in Spring 2002.

**CMHC Project Officer :** Thomas Green

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2383 0200001

**STATUS :** Ongoing

## INDOOR AIR POLLUTION FROM ATTACHED GARAGES

CMHC contributed to a Health Canada/Environment Canada project investigating the infiltration of garage-based pollutants into houses. Twenty-five Ottawa houses have been tested to determine the leakage area between the house and the attached garage. Pressure differentials were recorded and pressure testing was repeated during the winter months. Further field testing took place in the winter of 1998/99, including modeling of the IAQ implications and monitoring of pollutant entry when the garage is occupied by a "calibrated" car. Modeling has given different results, and there is additional work to model the results a second time in the fall of 2001. Reports on various aspects of the project are being prepared by the agencies involved. CMHC released a Research Highlight (Technical Series, 01-122) on the airtightness testing aspect of the project in summer 2001.

**CMHC Project Officer :** Don Fugler

**CIDN :** 1910 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Research Highlight is available

## PRINCE EDWARD ISLAND BIRTH COHORT STUDY OF MOLD IN HOMES

This joint study between CMHC, Carleton University, Health Canada and others is examining a large sample of homes in Prince Edward Island to determine the biological exposure, house performance parameters and energy use characteristics of a statistically-representative set of houses occupied by newborn babies. Part of the study will follow the health of these babies to determine the degree to which damp and moldy houses result in increased infant health problems. A total of 231 houses have been tested at the end of the fourth year of the project. An additional 60 houses are to be tested during winter 2001-02. Due to the long term nature of this research, research reports have not as yet been issued.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 1618 0300001- 2

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RENOVATING THE HOME FOR ASTHMA: AN INTERVENTION STUDY

The purpose of this project is to study the relationship between air quality in housing and respiratory health in renovated housing. Health Canada, Carleton University and Natural Resources Canada are partners and are represented in the project advisory committee. Funding is from CMHC, with contribution from the Program for Energy Research and Development (PERD). The methodology is similar to that of a completed pilot project which studied the effect of renovating the homes for indoor air quality on the asthmatic condition of the occupants. This project will look at 20 case studies of moldy houses selected from different parts of the country and renovated by their owners. Remediation of the houses will incorporate measures to improve their energy efficiency. The output will be a research report that will be of interest to builders and renovators, the general public, the asthmatic population, researchers and physicians. The study should be complete by late 2002.

**CMHC Project Officer :** Virginia Salares

**CIDN :** 2157 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY

CMHC is participating in an Industrial Research Chair in Health and Indoor Air Quality at Carleton University. The principal funding for this Chair is being provided by the Natural Sciences and Engineering Research Council (NSERC), Paracel Laboratories, Morrison Hershfield Ltd., Health Canada, Kingston General Hospital, Carleton University and CMHC. The Chair, in collaboration with its partners, will develop more rapid and cost effective methods for measuring the types and amount of mold in buildings and exposures of the occupants, construct a database of cultures of molds found in moisture troubled buildings, prepare purified extracts of the molds for allergy diagnostic tests and undertake studies of the effects of these molds on lung cells. The output from this Chair would have far-reaching benefits for the general population in the clinical diagnosis of mold allergy and the mitigation of mold contaminated buildings. A five year research program of the Chair is underway.

**CMHC Project Officer :** Virginia Salares

**CIDN :** 2269 0600

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## STUDY OF DISPLACEMENT VENTILATION SYSTEMS FOR RESIDENTIAL HOUSES WITH RADIANT FLOOR HEATING SYSTEMS

It is estimated that about 1% of Canadians are environmentally hypersensitive. These people suffer partial to total debilitation. Some of them require a home environment that is as free as possible from air-borne contaminants. Designing and constructing such houses are hampered by the lack of practical guidelines both for selecting suitable building materials and furnishings, and for designing and installing effective ventilation systems. The Canada Mortgage and Housing Corporation has recently designed and constructed a prototype house for environmentally hypersensitive individuals. It includes a range of features to help to achieve an acceptable indoor environment for these people at a minimal cost. These features include the use of commercially available low emission building materials and easily cleanable interior finishing, and a specially designed displacement ventilation system.

A joint project was established between the Canada Mortgage and Housing Corporation and the Institute for Research in Construction to assess the performance of the displacement ventilation system installed in this prototype house. This report presents the results of this evaluation.

The results will help to develop guidelines for designing and constructing suitable and affordable housing for environmentally hypersensitive individuals. Some of the measures used in this prototype house may also be adopted in new and existing houses to improve indoor air quality.

*Prepared by J.S. Zhang, R.J. Magee and C.Y. Shaw of the National Research Council of Canada. Ottawa: Canada Mortgage and Housing Corporation, 2001. 26 pages*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### LAND USE ISSUES IMPEDING AFFORDABLE HOUSING WITH MOBILE HOMES

This project report is a land use study focusing on the legislative barriers to manufactured housing. This project was divided into three phases and a final report. Phase 1 reviews and compares Canadian and American manufactured housing legislation, regulatory barriers and government and industry approaches to these barriers. Phase 2, analyzes the Canadian manufactured housing industry, identifies the major issues, suggests how the American model may apply, and recommends how the existing legislative barriers can be addressed. Phase 3, focuses on municipal regulations and includes a survey of Ontario municipalities and a survey of municipal solicitors regarding zoning discrimination. The final report contains all three phases and an action plan, which sets out direction and strategy for addressing legislative barriers that negatively affect manufactured housing development in Canada at all levels of government.

*Prepared by Ron Corbett. CMHC Project Officer: Doug Pollard. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2001. 146 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### MANUFACTURED HOUSING CONSULTANTS' TRAINING PROGRAM - PHASE II

This is a partnership project between the Canadian Manufactured Housing Institute (CMHI), the Provincial Manufactured Housing Associations of B.C., Alberta and Saskatchewan, Ontario and Atlantic Canada, and CMHC. The purpose of this project is to build on and improve the two day Manufactured Housing Consultants' Training Program and to ready it for ongoing delivery at the provincial level. The participant's manual and the trainer's material will be revised to incorporate improvements resulting from the pilot program, and new additional material will be developed such as: section for modular retailers, participants workbook, and marketing and promotional materials. These changes are necessary to ensure a high level of quality, effectiveness and consistency of the course delivery by the various provincial industry associations. This work is anticipated to be completed by late 2001. Once this work is completed, the program will be delivered through a partnership arrangement with provincial associations/organizations and it will be open to all representatives of the manufactured housing industry in Canada.

**CMHC Project Officer :** Darrel Smith

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2410 0200001

**STATUS :** Ongoing

### MANUFACTURED HOUSING: UPDATING AND REWRITING LOCAL REGULATIONS: REGIONAL DISTRICT OF NORTH OKANAGAN = L'HABITATION USINÉE : MISE À JOUR ET RÉÉCRITURE DES RÈGLEMENTS LOCAUX : DISTRICT RÉGIONAL DE NORTH OKANAGAN

The purpose of this project, sponsored by B.C.'s Regional District of North Okanagan (RDNO), was to end discrimination against manufactured housing and encourage its parity with site-built homes. In the RDNO, officials recognized the need for more affordable housing within the jurisdiction and wanted to promote and encourage alternative housing forms. They realized their out of date regulations governing manufactured housing were part of the problem. This project examined the regulatory environment for manufactured housing in the Regional District of North Okanagan, in south central British Columbia. As a result, the RDNO and one of its incorporated townships adopted regulations making it easier for this type of housing to flourish. It proposed solutions, that if adopted Canada-wide would put manufactured housing on an equal regulatory footing with site-built homes. The adopted RDNO Manufactured Home Community Bylaw is included as an appendix in this ACT case study.

## MANUFACTURED HOUSING

Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2000. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study)

Order Number: 61425

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

**\*\* SEE ALSO:** Design Multiple Unit CHUM's and Modular House Packages for Urban and Suburban, Remote and Northern Communities, p. 51.

## MOISTURE AND MOLD

### BETTER BUILDINGS CASE STUDY - CONDENSATION CONTROL IN THE EXTERIOR WALLS OF THE CCOC APARTMENT BUILDING AT 520 BRONSON STREET; A DBZ REMEDIAL REPAIR PROJECT

This project's objective is to provide CMHC with information (text, photos and drawings) to document, as a case study, the installation and performance of a DBZ system in the building mentioned above.

**CMHC Project Officer :** Luis de Miguel

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 1782 0300036

**STATUS :** Ongoing

**\* NEW \***

### CLEANING UP YOUR HOUSE AFTER A FLOOD AND CLEAN-UP PROCEDURES FOR MOLD IN HOUSES

Two CMHC publications, "Cleaning Up Your House After a Flood" and "Clean-up Procedures for Mold in Houses", are undergoing revision. These documents have been widely used since 1993. The revision will incorporate the most up-to-date information on dealing with mold and provide steps for homeowners to follow in assessing and fixing the problem.

**CMHC Project Officer :** Virginia Salares

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2447 0200001

**STATUS :** Ongoing

**\* NEW \***

### CONDOMINIUM OWNERS' GUIDE TO MOLD. ABOUT YOUR HOUSE; CE36

This eight page fact sheet is designed to teach condominium owners and occupants how to recognize mold and how to take action against mold. It describes what molds are, what makes them grow and why molds are a concern. It covers when and how to seek professional help, steps to follow in cleaning up small mold areas, and how to deal with an ongoing problem. In addition, it lists basic steps to prevent mold and reduce mold growth and provides answers to the most frequently asked questions about mold.

Ottawa: Canada Mortgage and Housing Corporation, 2001. (About Your House; CE36) 8 pages

NOTE : Aussi disponible en français sous le titre : Guide sur la moisissure à l'intention des copropriétaires; Votre maison; CF36



## MOISTURE AND MOLD

**STATUS :** New Completed Fact Sheet

**AVAILABILITY :** CMHC Information Products and available on CMHC's web site. To download this document visit CMHC's web site at:  
<http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/index.cfm>

### DEFINING PERFORMANCE OF WATER RESISTIVE BARRIERS

Water Resistive Barriers (WRB), also known as sheathing membranes, fulfill many critical functions in the building envelope, but the means to evaluate their field performance has not been adequately developed. This is a pilot project that aims to define the key elements affecting performance of WRB in stucco systems with a view to pursuing the following objectives:

1. Develop adequate experimental characterization of likely WRB field performance.
2. Define WRB characteristics needed for input into advanced Heat Air and Moisture (HAM) models.
3. Examine probable long-term performance of WRB and in particular, study the effect of chemical leaching from stucco products and wood based materials.
4. Compare the results of wetting and drying predicted by advanced HAM models with experimental results.

It is expected that helping manufacturers and users of breather-type moisture barriers define the performance of such materials in both conventional and rainscreen walls will lead to better differentiation between applications of different WRB products as well as in development of new products.

Project participants include CMHC, the Homeowner Protection Office of BC, E.I. Dupont de Nemours Inc., Fortifiber Corporation, HAL Industries and Concordia University.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2490 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

### GUIDELINES FOR MOISTURE MANAGEMENT IN EXTERIOR WALL SYSTEMS

CMHC is providing financial and technical support to NRC/IRC to develop guidelines for moisture management strategies for exterior wall systems. The guidelines will address user requirements for long-term performance and durability of wall systems for the wide range of climate zones across North America.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2199 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### GUIDELINES FOR THE MEASUREMENT OF MOISTURE CONTENT IN FRAMED LUMBER

The objective of this project is to prepare a guideline document or protocol for the proper use of moisture measurement tools in measuring the moisture content in a framed wall lumber assembly. The document will outline a process of how to take moisture readings, where to take moisture readings and how the moisture readings are corrected for temperature and wood species. In addition, the document will provide a general discussion about assessing the overall moisture content of the wood framed assembly.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2398 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## IMPROVEMENTS TO THE MOISTURE PERFORMANCE OF PRESERVED WOOD FOUNDATIONS

Previous work by Forintek, the wood industry research agency, has established that the bottom plate of preserved wood foundation walls is very often over 20% moisture content. The wood preservatives generally prevent this relatively high moisture content from causing any degradation in structural strength. However, it is possible that the wet plate will transfer moisture to the insulated cavity above. This may lead to the development of mold in the wall cavity. The objective of this research project is to retrofit a mold troubled Ottawa area preserved wood foundation to validate a practice for reducing a high moisture level and mold within the PWF cavity. The demonstration house has been modified by using fans to ventilate the lower part of the wall cavities. Monitoring of wood moisture levels will continue through 2001. A report on the findings is being prepared in the fall of 2001.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2419 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## MOLD CLEANUP PROCEDURES: CONTRACTORS' GUIDE

A draft document for professionals on Mold Cleanup Procedures is under development by CMHC. The focus of the document is on information required by contractors involved in renovation and clean-up of mold contaminated houses. As a result of rapidly evolving knowledge in this field, the current draft of the document and its mold cleanup procedures are now being revised to incorporate more current and substantive information from authoritative sources. This document will address mold cleanup in general and will include information on the precautionary measures required to protect workers and occupants, and present best practices for mold remediation. A significant change in approach since preparation of the original draft is the expert consensus that mold remediation should be approached from the perspective of the size of visible mold area rather than the type or toxicity of the molds present.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 2380 0200

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## MOLD IN HOUSING: AN INFORMATION KIT FOR FIRST NATIONS COMMUNITIES

The information in this kit will assist First Nations communities to recognize when there is a mold problem and to take the necessary steps to deal with the problem. This kit is intended for:

- technical service providers (inspectors) ;
- First Nations housing departments -- housing coordinators and maintenance staff;
- bands -- band managers, housing providers;
- health providers -- community health nurses/representatives and environmental health officers;
- occupants; and
- trades -- builders, contractors and renovators.

Mold is a widespread and common problem in houses anywhere, both in and outside First Nations communities. It can be a minor nuisance or it can have major effects on the occupants.

Mold in houses does not happen overnight. The solutions are also not immediate. A strategy needs to be adopted that includes responding to existing situations, preventing future problems and planning new construction. The responsibilities of the key players and their training needs are identified in this kit.

## MOISTURE AND MOLD

The first part of this kit (chapters 1 to 5) is basic information. It is written for occupants. The second part (chapters 6 and 7) clarifies the responsibilities of the key players and identifies the training they need. The third part (chapters 8 to 17) deals with specialized topics and is directed to housing providers.

*Ottawa: A joint publication of Canada Mortgage and Housing Corporation, Health Canada, and Indian and Northern Affairs Canada, Assembly of First Nations Housing Secretariat, 2001. 91 pages*

**Note:** Publié aussi en français sous le titre : La moisissure dans les logements : Trousse d'information pour les collectivités des Premières nations

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## NORTHERN HOUSING

### COMPARISON OF NORTHERN HOUSING COSTS

This project will outline all components associated with the production of a northern home - from soft to hard, at both the house level and community level to determine which elements, in which locations are inordinately skewing costs. Use of direct data from northern communities will verify these costs. Index communities will allow for comparison of costs between northern communities, and between the North and South. The operationalized database will permit future tracking and analysis such as life cycle performance costs; where use of local labour, indigenous materials and value-added processing of raw, local materials can be developed or expanded to reduce housing costs; and where capacity building may be of benefit.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2370 0200003

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### CONTINUATION OF NORTHERN VENTILATION STUDY

This project is a continuation of related CMHC research into ventilation needs and performance in northern homes. Adequate, appropriate and affordable means of ventilation and verification of manufacturer's claims need to be assessed, using an established, consistent methodology. Practical and effective options for ventilation are needed to alleviate potential health problems and building damage. The report will be completed in 2002.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2420 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***



## INNOVATIVE FOUNDATIONS, HEATING & VENTILATION

This R&D&C (research, development, commercialization) project and first stage monitoring is complete. CMHC, Yukon Housing Corporation (YHC) and Yukon Energy partnered in building two research/demonstration houses in Dawson City, Yukon. This work is a continuation of previous successes in R&D&C of the space frame foundation technology now being exported to Alaska. The thrust of the current foundation work is to reduce cost, develop a technology that can be locally manufactured and reduce the height of the crawl space.

A torque tube HSS steel section is under one house. The other house will be an extension of the sheet metal reinforced plywood monocoque technology resting on three bearing points. Lots of ground movement has been reported so the test site is proving to be a good demonstration. After a review of northern and remote technology, the heating and ventilation systems incorporate and optimize energy efficiency, minimal equipment and sustainable ventilation operation. Construction is complete and the houses are occupied. Commissioning of the project was a large task and the systems appear to be running efficiently at about half the energy consumption of a typical northern house. The mechanical technology was used on another YHC project at substantial capital savings and with some modifications appears to be the technology of choice. Work is underway to develop a more cost effective and simple foundation system.

**STATUS :** Completed

**AVAILABILITY :** Product is not yet available

## MONITORING OF THE NORTH ON-SITE WASTE WATER RECYCLING MICROSYSTEMS

Two microsystems were installed in N'Dilo, NWT in the summer of 1998. These microsystems were adapted from the Toronto Healthy House model for Cold Climate application. Monitoring since installation has allowed for fine-tuning and collection of reliable data. In turn, this has proven the microsystems as economical, viable and as one of the most environmentally responsible ways in which to handle water consumption and waste water disposal. Additionally, health benefits to the occupants have been observed through upgrading of water availability and use. Based upon this data, these systems are now in place, or scheduled for placement in 5 northern communities and have been marketed successfully internationally. Partners in this project include NWT Housing Corporation, GNWT's Department of Resources, Wildlife and Economic Development, Stanton Regional Health Board, Synergy Solutions and the Dene Housing Authority of Yellowknife. Three years of monitoring data will be compiled into a report in late 2001.

**CMHC Project Officer :** Aleta Fowler

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :**

**STATUS :** Ongoing

**\* NEW \***

## NORTH ABOUT YOUR HOUSE SERIES

The North About Your House series is a series specifically designed around day to day northern solutions as well as innovative northern models of building practices which work under cold climate conditions. This series compliments the more in-depth North Research Reports. In this series you will find examples of how to use structural panels in the high arctic, means to cleanse wastewater in the North as well as demonstrated ways of constructing a roof which can withstand northern conditions and how to choose a foundation system which will work in any of the northern communities. Upcoming, expect articles on how to solve common northern problems such as preventing vent stacks from freezing, how to keep your trucked water tank clean and how to reduce your utility costs through alternative means of energy production. The "North" series presently includes:

## NORTHERN HOUSING

- Building with Structural Panels - Repulse Bay
- On-Site Wastewater Reclamation Systems for the North
- Eagle Lake Healthy House
- Residential Foundation Systems for Permafrost Regions
- Snowshoe Inn, Fort Providence Co-Generation Model
- Arctic Hot Roof Design

**STATUS :** New Completed Fact Sheets

**AVAILABILITY :** CMHC Information Products and available on CMHC's web site. To download this document visit CMHC's web site at:  
<http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/index.cfm>

### NORTH WEB-SITE

The purpose of this partnership project is to renovate the former NoRTH web site and maintain this updated dedicated NoRTH web-site for a two year period. The project partners are CMHC, Alaska Housing and Finance Corporation, NWT Housing Corporation, University of Alaska (Fairbanks), NRCan and Yukon College. The web-site will include relevant technical information such as factsheets of research reports and the Frostline newsletter. It will also includes discussion groups to provide a means of ongoing and current communication. The web-site will supply links to other relevant web-sites and will be able to be visited at [www.NoRTH-RTHN.org](http://www.NoRTH-RTHN.org). Alaska Housing Finance Corporation will retain a person to post the backlog of articles, to recruit new material needed by northern audiences, implement the planned next steps such as negotiating links to critical sites, creating a chat room format, etc. and respect the need by CMHC and NRCan to retain their harmonized "look" and post their materials in both French (supplied by CMHC and NRCan) and English. Renovation will be completed in calendar year 2001.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2369 0200

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet on the web

### NORTHERN HEALTHY HOUSE DEMONSTRATION

A demonstration Healthy House is being planned in northern Canada. This Yellowknife demonstration builds upon a long line of research and is the necessary step in illustrating Healthy House (HH) principles and practices. This demonstration will allow interested parties to view the performance and use of Healthy Housing components, permit informed choices for applications in the North, nationally and internationally, and encourage more widespread adoption of Healthy House and "better" housing and community models. The Demonstration will include an "educational" component and will be open to the public upon completion of construction in 2002.

**CMHC Project Officer :** Aleta Fowler

**CIDN :**

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## NORTHERN HEALTHY HOUSE FEASIBILITY STUDY

The North has proven itself receptive to Healthy House components as demonstrated by the success of the adoption of microsystems in numerous communities. The North is at a critical juncture with de-evolution of housing responsibility to the community level. Many communities are debating primary housing and infrastructure issues. This project identifies all Healthy House components, with each of their options, to allow communities to make choices based upon their specific circumstances. The draft feasibility report was produced in the Spring of 2001; the final version will be available in calendar year 2001. NWT Housing Corporation and Arctic Energy Alliance will be producing a mixed use Demonstration Project with CMHC. Planning is underway based upon the feasibility draft; construction will commence in 2002.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2368 0200002

**Division :** Research Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

## RESIDENTIAL FOUNDATION SYSTEMS FOR PERMAFROST REGIONS

Permafrost underlies all of the Yukon, Northwest and Nunavut Territories and much of the northern portions of the provinces, especially Manitoba and Quebec. Frozen ground conditions can have significant adverse effects on structures in the North. The effects of settlement and frost heaving commonly result in the premature deterioration of residential structures. Problems related to foundation design and construction can be reduced to a minimum if care is taken in the selection of suitable sites and appropriate foundation systems.

This project is a study on foundation systems for use in northern permafrost and intermittent permafrost areas. The study assembled, documented and analyzed all data possible from literature searches and from the field on all known foundation systems used in the North. The final report includes a decision making tree to enable communities, homeowners, builders and renovators to make informed and appropriate choices in foundation systems.

*Prepared by AGRA Earth & Environmental Limited. CMHC Project Officer: Aleta Fowler. Ottawa: Canada Mortgage and Housing Corporation, 2000.*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## UPDATE THE NORTHERN UTILITY COSTS REPORT

In 1995, the NWT Housing Corporation commissioned one of the most useful reports for the North, "Utility Costs in Public Housing". It covered every community in NWT (and in, what is now, Nunavut) outlining the subsidized and unsubsidized rates for water and sewer, electricity and heating. Average cost break-outs were calculated for each region and the percentage of monthly costs allocated toward each utility was measured. This report has been instrumental in justifying and strongly illustrating the cost savings of new technologies such as on-site waste water recycling microsystems. CMHC is updating this utility cost report to expand upon four additional aspects:

- inclusion of the entire North: Labrador, Nunavik, Nunavut, NWT and Yukon.
- the source of electricity (hydro, diesel generator) and whether it is a franchise or not
- the source of heating fuel (oil, wood, propane, natural gas)
- a separate category including access to phone and Internet service



The updated report will be available in 2001.

**CMHC Project Officer :** Aleta Fowler

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2467 0200001

**STATUS :** Ongoing

**\* NEW \***

## USE OF COMPRESSED-AIR-FOAM TECHNOLOGY FOR FIRE PROTECTION OF HOUSING IN THE NORTH

The high cost of northern housing, and housing insurance, may justify the installation of fixed automatic fire suppression systems. Conventional sprinkler systems require more water than is presently available in buildings and would entail substantial re-design. Further, although sprinkler systems may allow some occupants of the building time to exit, and may allow time for fire fighters and equipment to arrive, water damage in suppressing the fire usually damages the building beyond reasonable repair. The National Research Council of Canada (NRC) has developed a compressed-air-foam (CAF) system which uses 10% of the water required by conventional sprinkler systems. Further, it is designed to extinguish, not just contain or suppress, fires. This study is a partnership project. It will look at the preliminary feasibility of the design of a self-contained CAF system for a building (optimal CAF piping and discharge), assessment of the water requirements for the CAF system, and the development of appropriate CAF nozzles.

**CMHC Project Officer :** Aleta Fowler

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2311 0200002

**STATUS :** Ongoing

## USE OF ON-SITE WASTE WATER RECYCLING MICROSYSTEMS FOR SPRINKLER SUPPLY

With microsystem technology, excess water of "swimming pool" quality is constantly produced which must be periodically pumped away, or disposed of on-site. This excess water could be easily stored for sprinkler use. In the North, loss of life due to fire is 10 times higher than in the South. Building loss, when a fire occurs, is nearly 100%. Most communities rely upon volunteer fire departments and upon reservoirs which have limited capacity. Alternatives are needed and this study will determine the means and feasibility of taking this next step. The report is expected in early 2002.

**CMHC Project Officer :** Aleta Fowler

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** N/A

**STATUS :** Ongoing

**\* NEW \***

## NORTHERN HOUSING

### YUKON FLEX/HEALTHY HOUSING DEMONSTRATION

Yukon Housing Corporation (YHC) is developing a mortgage incentive program for people who choose to incorporate Flex and Healthy Housing features into their homes. CMHC is partnering with YHC to develop a Demonstration Home which illustrates use of these features and documents the decision-making points, the regulatory issues, the design and construction processes, and the final user reactions. The home will be open to the public for observation as well. Construction is planned for summer 2002; the home will be open to the public shortly thereafter, concurrent with publication of the report documenting the Demonstration.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2469 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

- \*\* SEE ALSO:**
- Evaluation of the Measurement of Housing Need in Northern and Remote Communities, p. 106
  - Alternative Home Energy Sources for the North, p. 22
  - Design Multiple Unit CHUM's and Modular House Packages, p. 49
  - Northern Heating and Ventilation Systems, p. 29

## PROPERTY MANAGEMENT

### TECHNICAL AUDIT COURSE FOR PROPERTY MANAGERS

This project aims to develop a course for property managers on the technical audit of high-rise residential buildings. Using a building as a system approach, this course will provide property managers and building owners with a perspective of the interaction of all building systems and components. Such training is not available to residential property managers in Canada. Technical audits, an organized review of building systems, are an effective way to assess the condition of a building, to understand how the building is performing and to provide a sound basis for making maintenance, repair and upgrade decisions. The course provides the property manager with insights into the technical audit process and highlights the requirements for undertaking technical audits of residential buildings including the scope of the work, the consultant qualifications. The course also introduces the fundamental principles of building science to encourage holistic solutions to building problems.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2297 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RENOVATION AND INSPECTION

### ABOUT YOUR HOUSE - HIRING A HOME INSPECTOR

The purpose of this project is to produce a four to six page fact sheet on "Hiring a Home Inspector". The fact sheet would be included in the About Your House series and would offer helpful guidance to consumers on questions to ask and what to look for when in the market for a qualified home inspector. The fact sheet would be done in consultation with the private home inspection industry through members of the Canadian Association of Home and Property Inspectors (CAHPI) as well as through home and property inspector members of the Canadian Home Inspectors and Building Officials committee. The fact sheet will include information on, but not be limited to, the following:

## RENOVATION AND INSPECTION

- current situation (who is out there and what regulations exist)
- CAHPI's national initiative (purpose and objectives)
- services provided by home inspectors and why they are needed
- questions to ask and what to look for when hiring a home inspector
- what to expect (time involvement, cost, written report)

The fact sheet is anticipated to be completed by Fall 2001.

**CMHC Project Officer :** Darrel Smith

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2486 0200001

**STATUS :** Ongoing

**\* NEW \***

## CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS NATIONAL INITIATIVE

With the successful completion of the first phase of this multiphase project, which was to develop national occupational standards for the private home inspection and municipal building code inspection sectors, the Canadian Home Inspectors and Building Code Officials are now preparing for Phase II which is to use the occupational standards to:

- conduct a gap analysis to identify any curriculum and training needs;
- develop curriculum and training programs to meet their needs;
- identify a certification and accreditation model that could be adopted for their industry sectors;
- establish an accreditation program for institutions delivering training programs.

Following the completion of Phase II, the two sectors should be in a position to implement the certification programs for their respective industry sectors under Phase III. This project is supported by the private and public inspection industry sectors, Human Resources Development Canada and CMHC.

**CMHC Project Officer :** Darrel Smith

**Division :** Research Division

**AVAILABILITY :** The occupational standards can be obtained through the industry sectors, i.e. Alliance of Canadian Building Officials Association and the Canadian Association of Home and Property Inspectors, or on loan from the Canadian Housing Information Centre

**CIDN :** 1962 0200002

**STATUS :** Ongoing

## CMHC SPONSORED FEASIBILITY STUDY ON USING THE PRIVATE HOME INSPECTION INDUSTRY TO COLLECT DATA ON THE PHYSICAL CONDITION OF CANADA'S EXISTING HOUSING STOCK

The purpose of this project was to conduct a feasibility study on the use of the private home inspection industry nationally as a vehicle for gathering data on housing characteristics and physical conditions. The study investigated the type of information desired by CMHC and the type of information currently being gathered by the inspection industry. The study considered the various reporting systems being used, the numbers and types of homes inspected annually, geographic coverage, reliability of the information, anticipated costs, confidentiality requirements, use limitations and potential contractual arrangements for obtaining this and other data for CMHC's purposes. The final report for this study is complete. Next steps involve an investigation of similar interests by other groups and departments, internal and external to CMHC to consider the possibility of undertaking a coordinated data collection project.

Prepared by Applegate Ventures Ltd. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Darrel Smith. Ottawa: CMHC, 2001. 112 pages

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



### FEASIBILITY STUDY FOR A HERITAGE RENOVATION ASSISTANCE SERVICE, LAC-SAINT-JEAN HISTORICAL SOCIETY, ALMA, QUEBEC = ÉTUDE DE FAISABILITÉ SUR UN SERVICE D'AIDE À LA RÉNOVATION PATRIMONIALE, SOCIÉTÉ D'HISTOIRE DU LAC-SAINT-JEAN, ALMA (QUÉBEC)

This case study documents the work of the Lac-Saint-Jean Historical Society which received an A.C.T. grant to study the feasibility of establishing a "Heritage Renovation Assistance Service". This Service is targeted at those involved in the renovation process and provides both do-it-yourself and professional home renovators with a comprehensive and easy-to-understand source of information on acceptable renovation techniques and materials. The case study report describes the project's aims and results, and the community and key players involved. The benefits resulting from the Service are described as well as how this type of service would be useful to renovators in other municipalities.

*Case study written by: Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 38 pages*

Order Number: 61994

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

### GUIDE FOR THE HEALTHY RENOVATION OF A ONE STOREY HOUSE CIRCA. 1960-1979

The objective of this project is to provide consumer information on typical approaches to the repair and renovation of bungalow-style houses built between 1960-1979. The advice considers occupant lifestyle and needs, structural and maintenance requirements, "Healthy Housing" improvements (including environmental and energy-efficiency), and the impact on home equity and resale value. The publication will include case studies of common renovations to this style of house. The guide will resemble the initial publication in this series which describes appropriate renovations to 1½ storey houses. The report is being prepared for publication.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2202 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### HIRING A CONTRACTOR. ABOUT YOUR HOUSE; CE26A

At some time, most homeowners will hire someone for repairs or renovations. Even a homeowner experienced in home repairs may have to hire a contractor because of the size or level of difficulty of the job. This fact sheet helps homeowners choose a contractor and work effectively and fairly with the chosen contractor. Topics covered include getting estimates, writing a contract, paying for the work, consumer protection laws, and insurance.

*Ottawa: Canada Mortgage and Housing Corporation, 2001. (About Your House; CE26a) 6 pages*

NOTE : Aussi disponible en français sous le titre : Choix d'un entrepreneur. Votre maison; CF26a

**STATUS :** New Completed Fact Sheet

**AVAILABILITY :** CMHC Information Products and available on CMHC's web site. To download this document visit CMHC's web site at:  
<http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/index.cfm>

## MANDATORY HOME INSPECTIONS ON RESALE HOMES IN ONTARIO

A CMHC External Research Program (ERP) grant has been awarded to research the issue of mandatory home inspections for resale homes in Ontario with a number of housing industry interest groups. The results will be an attempt to determine why this requirement was never imposed in the past, the pros and cons of enacting such a requirement in the future, and how could such a requirement be enacted and by whom. The study will also investigate if the existing home inspection industry could handle the increased capacity of such a requirement. The research is anticipated to be completed by early 2002.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2437 0200015

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

## NATIONAL RENOVATORS' TRAINING PROGRAM - REVISION 2000

The purpose of this project is to revise and amend the course content and format of CMHC's National Renovators' Training Program. As discussed with the Canadian Renovators' Council, this work will implement the short-term and long-term improvement recommendations presented in the CMHC report Renovator Training in Canada: Current Situation and Future Strategies. One significant revision will allow for the course to be presented effectively in two phases, with five three hour modules in each phase. An optional schedule will also be included to permit delivery of the program in shorter, evening sessions. The revision is underway and the manuscript should be completed by October, 2001.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2387 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PRIORITIZED PRACTICAL APPROACHES FOR ESSENTIAL REMEDIATION, REPAIR AND MAINTENANCE PROJECTS

The purpose of this project was to identify and prioritize essential remediation work which must be completed before undertaking common renovation projects. Information has been produced in twelve independent fact sheets on how to identify the prioritized work, consequences of not doing the work, practical solutions, and benefits. This information will be useful to homeowners to help them prioritize essential repair work either in isolation or as part of a renovation project. The information can also be used by renovators as a tool to help convince homeowners of other essential repairs which need to be corrected as part of a renovation project when applicable. These twelve "Before You Renovate" fact sheets include the following titles:

- Assessing the Renovation Project. About Your House Series; CE 28a
- Before You Start Renovating Your Basement - Structural Issues and Soil Conditions. About Your House Series; CE 28b
- Before You Start Renovating Your Basement - Moisture Problems. About Your House Series; CE 28c
- Before You Start Renovating Your Kitchen. About Your House Series; CE 28d
- Before You Start Renovating Your Bathroom. About Your House Series; CE 28e
- Before You Start Window and Door Renovations. About Your House Series; CE 28f
- Before You Start Repairing or Replacing Roof Finishes. About Your House Series; CE 28g
- Before You Start Repairing and Replacing Materials -- Exterior Walls. About Your House Series; CE 28h

- Before You Start an Energy Efficient Retrofit -- Mechanical Systems. About Your House Series; CE 28i
- Before You Start an Energy Efficient Retrofit -- The Building Envelope. About Your House Series; CE 28j
- Before You Start Assessing the Comfort and Safety of Your Home's Mechanical Systems. About Your House Series; CE 28k
- Before You Start a New Addition. About Your House Series; CE 28L

Ottawa: Canada Mortgage and Housing Corporation, 2001.

**STATUS :** Completed Fact Sheets

**AVAILABILITY :** CMHC Information Products and available on the Internet at:  
<http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/index.cfm>

### RECYCLE: LIFECYCLE - HOW TO RENOVATE A HOME FOR CHANGE

This project's objective is to provide a set of design strategies for adaptable renovations involving a variety of common, detached housing types. The goal of these strategies is to inform homeowners, or prospective homeowners, of ways to achieve the greatest flexibility through alterations and additions to their houses to meet their changing needs.

**CMHC Project Officer :** Thomas Parker

**CIDN :** 2437 0200014

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

### REVISION OF HOME CARE: A GUIDE TO REPAIR AND MAINTENANCE

The purpose of this project is to do a major update and revision of Home Care: A Guide to Repair and Maintenance. As part of the revision, the publication titled New Life for an Old House, which is no longer in print, would also be reviewed and where appropriate the information on home repair would be incorporated into Home Care to produce one comprehensive home maintenance and repair guide. The revised publication will include information from recent research and more specifically on topics including: home inspection, home repair (not renovation), home maintenance, Healthy Housing and FlexHousing tips, and how to hire a contractor, as part of the update. The content will emphasize Canadian issues whenever possible to differentiate it from similar American products. The revised manuscript is anticipated to be completed early 2002.

**CMHC Project Officer :** Darrel Smith

**CIDN :** N/A

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

### SAMPLE RENOVATION CONTRACT. ABOUT YOUR HOUSE; CE26B

The purpose of this project was to produce an About Your House fact sheet on a Sample Renovation Contract. The fact sheet includes an example of a contract to illustrate what should be included in a contract when undertaking renovation work. It also includes a commentary to explain what and why the various aspects of a contract are important. The Canadian Home Builders' Association (CHBA) participated on the review committee for this project.

Ottawa: Canada Mortgage and Housing Corporation, 2001. (About Your House; CE26b) 12 pages

**NOTE :** Aussi disponible en français sous le titre : *Modèle de contrat de rénovation. Votre maison;* CF26b



## RENOVATION AND INSPECTION

**STATUS :** New Completed Fact Sheet

**AVAILABILITY :** CMHC Information Products and available on CMHC's Web site. To download this document visit CMHC's Web site at:  
<http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/index.cfm>

## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

### CANADIAN HOMES AND CLIMATE CHANGE

The object of this research is to create a guide for consumers on Canadian homes and climate change. The guide, in the form of a questionnaire, will help consumers identify where they can make changes in their activities and households to minimize their greenhouse gas creation. CMHC will contribute the Guide as part of the broadly based, national social marketing initiative to reduce climate change. A draft questionnaire has been prepared and published in various publications. The questionnaire was redrafted for easier use but the poor user response to the questionnaire suggests that more revisions are required.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2120 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### CONSTRUCTION RESOURCE MANAGEMENT COURSE - PHASE II

A private and public sector consortium was established to develop a methodology for assisting industry to better understand, control and reduce the levels of construction, renovation and demolition (CRD) waste. The partners included; Department of National Defense, Industry Canada, Canada Mortgage and Housing Corporation, Alberta Environmental Protection, NWT Department of Resources, and PCL Constructors Canada Inc. Phase I was the development of a CRD training course in hard copy. The course provides practical and comprehensive information on resource management issues in the Canadian CRD industry. It is intended for project managers which include, but are not limited to: engineers, architects and CRD contractors. Phase II consisted of the development of an Internet based CRD project management course that would: provide current resource management information and case-specific solutions; contribute to the development of standard managerial practice; promote widespread communication of the best resource recovery techniques, contribute to economic growth and job creation; promote long-term behavioural change; and help industry associations and government departments meet mandated environmental targets.

**STATUS :** Completed

**AVAILABILITY :** To obtain more information on the CRD Course please contact Vince Catalli at byDesign Consultants (613) 759-4605 or at [www.bydesignconsultants.com](http://www.bydesignconsultants.com).

### DEVELOP A SET OF ENVIRONMENTALLY SUSTAINABLE SITE AND BUILDING DESIGN, CONSTRUCTION AND OPERATION GUIDELINES FOR SINGLE AND MULTI-FAMILY UNIT HOUSING, MOTELS AND HOTELS FOR THE TOWN OF BANFF

The purpose of this project is to develop a set of environmentally sustainable site and building design, construction and operation guidelines for single and multi-family unit housing, motels and hotels for the Town of Banff in a manner which could be used to inform the development of similar guidelines for other communities across Canada.

**CMHC Project Officer :** Doug Pollard

**CIDN :** 2309 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ECOPERTH: A SMALL RURAL COMMUNITY TAKES ACTION ON CLIMATE CHANGE

By communicating the experience of Perth, Ontario, this project shows how a small rural town can respond to the issues of climate change. The planning and implementation of many initiatives of EcoPerth, a community-based project, are described. The initiatives fall into four categories: The Green Team (planting trees, naturalizing the land and promoting local food), the Building Team (use less energy at home, work and play), the Transportation Team (finding innovative ways to simply get around) and the Communication Team (Getting the word out and moving from awareness to action).

Ottawa: Canada Mortgage and Housing Corporation, Research Division, 2001. (Research Highlights. Socio-economic Series; no. 82 (5 pages)

Order number: 60975

Publié aussi en français sous le titre : *EcoPerth : une petite collectivité rurale réagit contre le changement climatique*

**STATUS** : New Completed Research Highlight

**AVAILABILITY** : Product is available on the web

## IMPLEMENTING SUSTAINABLE COMMUNITY DEVELOPMENT: CHARTING A FEDERAL ROLE FOR THE 21ST CENTURY

This research was undertaken to accelerate the implementation of sustainable communities in Canada and was designed to answer the following key questions:

- What are the essential features of sustainable community development?
- Why is sustainable community development so important to the future economic, social and environmental health and well being of Canadians?
- What is the current status of sustainable community development in the US, Europe, Australia, New Zealand and Canada, and more importantly, what are federal governments doing to support these innovative developments?
- What are the primary barriers to sustainable community development in Canada?
- What types of policy and program measures could the federal government implement in partnership with municipal governments and others to effectively stimulate the implementation of sustainable communities in Canada?

This report is written primarily for federal policy makers who are interested in promoting sustainable development and reducing greenhouse gases at the community level. However, it also provides resources for other practitioners - innovative developers, development consultants, planners and municipal, regional and provincial policy makers - who are also interested in implementing sustainable communities.

Information on "good practices", examples of the major features of sustainable communities and possible questions for assessing development proposals are provided. Five detailed case studies on successful and unsuccessful sustainable communities and included lessons learned with practical advice on marketing and financing are provided. Pictures and graphics illustrating the major features of sustainable communities are used throughout the report.

Prepared by P & A Peck & Associates. Written by Steven Peck, Ray Tomalty, Anna Hercz and Guy Dauncey. Prepared for Canada Mortgage and Housing Corporation and Natural Resources Canada. CMHC Project Officer: Doug Pollard. Ottawa: Canada Mortgage and Housing Corporation, 2000.

**STATUS** : Completed Report

**AVAILABILITY** : Canadian Housing Information Centre

## LIVING BY WATER GUIDEBOOK

The objective of this project is to prepare, publish, market and distribute a guidebook for waterfront residents on reducing environmental impacts of housing on aquatic and shoreline habitat.

**CMHC Project Officer :** Susan Fisher

**CIDN :** 2040 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PRACTICES FOR SUSTAINABLE COMMUNITIES

"Practices for Sustainable Communities" presents:

- A framework to identify and organize the practices --- the tools, strategies and activities -- that lead to greater sustainability; and
- Examples of sustainable community development practices.

This book makes the idea of sustainable development a practical reality. It is a Canadian view of the challenges of sustainability, with made in Canada case studies and solutions.

Included with the publication is SCIP, the Sustainable Community Indicators Program, developed by CMHC and Environment Canada. SCIP helps communities measure their progress in building and living sustainably. Communities can create a locale vision of sustainability and measure and monitor their progress in making that vision a reality.

*Ottawa: Canada Mortgage and Housing Corporation, 2000. 176 pages*

Order number: 62160 \*\*Price: \$59.95 + GST and handling charges.

NOTE : Aussi disponible en français sous le titre : Pratiques pour des collectivités durables

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

## RESIDENTIAL GREENWAYS IN TRANSITION: FOUR DECADES OF EXPERIENCE IN WATERLOO

This research describes Waterloo's Beechwood greenway system during its four decades of change in conjunction with municipal policies for urban residential development. It examines the types of greenway issues and conflicts that have occurred and reviews means for resolving them. It documents and assesses major stakeholders' satisfaction with greenway planning objectives and outcomes. Finally, it assesses the current and potential contributions of greenways in achieving measures of urban sustainability.

This report makes Waterloo's experience available to other municipalities wanting to initiate greenway programs or wanting to improve the role of existing greenway programs within the planning mandate.

*Prepared by Larry R.G. Martin. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Susan Fisher. Ottawa: CMHC, 2001. (External Research Program Report) 57 pages*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

### SOIL AND FLORA RESTORATION AFTER GROUND DISTURBANCE

This research will examine local soils and indigenous plants in the North to arrive at a means for restoring healthy ground cover after disturbance (such as construction), at the least cost. In the North especially, ground cover loss exacerbates erosion of buildings, roadways and community infrastructure. Soil damage due to exposure leads to summer dust which deteriorates building exteriors and heating systems; impedes the operation of windows and doors; and affects the health of both the occupants and the community at large. Ground cover damage is also one of the leading factors for the break-down of permafrost. This study has the possibility for developing entrepreneurial opportunities and will be of interest to communities, health care providers, northern housing providers as well as to other northern countries. The final report will be available in early 2002.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2311 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*\* SEE ALSO:** - Building Communities: First Nations Best Practices for Healthy Housing and Sustainable Community Development, p. 13

- Demonstration of Healthy Housing on Reserve, p. 14
- Northern Healthy House Demonstration and Feasibility Study, p. 59-60
- Yukon Flex/Healthy Housing Demonstration, p. 62, and
- The Socio-economic Sustainable Development & Healthy Housing Section, p. 123-127

## WATER CONSERVATION, REUSE & MANAGEMENT

### CASE STUDIES OF WATER CONSERVATION INITIATIVES IN MULTIS

CMHC, in partnership with City of Toronto Better Buildings Partnership, will document case studies of water conservation retrofits for multi unit residential buildings. The building profile, water conservation measures, costs and resulting water and energy savings will be described. The studies will serve as examples to encourage water use efficiency in other building and will appear on CMHC's website.

**CMHC Project Officer :** Catherine Soroczan

**CIDN :** 2239 0200

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### DOMESTIC COLD WATER BOOSTER PUMP CONTROL MONITORING PILOT PROGRAM = LE PROGRAMME PILOTE DE CONTRÔLE POUR POMPE RELAIS À EAU FROIDE DOMESTIQUE

This pilot study, in partnership with the City of Toronto, Minto, and CMHC assessed the performance of two different booster pump control systems in 7 multi-unit residential buildings. Booster pump performance was measured in terms of electrical energy and water savings. The study assessed the impact of booster pump savings on buildings retrofitted with water efficient fixtures to ensure that only the technology application is measured without the influence of other concurrent changes. By utilizing 7 buildings with different characteristics, (size, # units, occupancy type), the work also attempted to define what type of building profile will most benefit from utilizing this control system. The final report findings indicate that greatest impact is felt with respect to energy savings. Water savings are best achieved through a leak detection and appliance retrofit program.

## WATER CONSERVATION, REUSE & MANAGEMENT

Prepared by Alain Lalonde, Veritec Consulting Inc. and Andrew Pride, Minto Energy Management. Prepared for Minto Developments Inc., in cooperation with City of Toronto and Canada Mortgage and Housing Corporation. CMHC Project Officers: Cate Soroczan and Sandra Baynes. Ottawa: CMHC, 2001. 1 CD-ROM

NOTE: No. 01-118 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

**STATUS :** New Completed CD-ROM and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

### DUAL FLUSH TOILET PILOT PROJECT

CMHC is working with a number of municipalities across the country to conduct a pilot program for dual flush toilet systems in a variety of buildings. This study will monitor water consumption and toilet performance as well as customer satisfaction with the dual flush system. Twelve agencies from eight provinces are participating in the project which will see toilets installed in single family homes, multi unit residential buildings, municipal and commercial buildings. These dual flush toilets will be compared to typical 13L and 20L toilets as well as Ultra Low Flow 6L toilets on a consumption and cost basis. Anticipated results of this work will be the increased awareness of dual flush systems across the country, and an improved ability to overcome regulatory, technical, and perceptual obstacles.

**CMHC Project Officer :** Catherine Soroczan, Sandra Baynes **CIDN :** 2336 0200

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ECONOMIC FEASIBILITY STUDY OF WATER REUSE AND TREATMENT TECHNOLOGIES

The purpose of this project is to undertake and complete an economic feasibility study of water reuse and treatment technologies. The contractor will assess ten case studies of on-site water reuse applications. The final draft has been received and the case studies will be uploaded to the CMHC water website on a monthly basis. Further attention is being paid to the financial aspects of water reuse and full costing.

**CMHC Project Officer :** Catherine Soroczan

**CIDN :** 2089 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### IDENTIFY EXISTING AND EMERGING GREYWATER TREATMENT AND RE-USE TECHNOLOGIES AND TO EXPAND AND REVISE ITS TECHSPEX SOFTWARE TO INCLUDE GREYWATER OPTIONS

This project's objective was to undertake and complete a review of the emerging greywater treatment and re-use technologies and the expansion and review of the TechSpex software to include greywater options.

**CMHC Project Officer :** Catherine Soroczan

**CIDN :** 1927 0200005

**Division :** Research Division

**STATUS :** Completed

**AVAILABILITY :** There will be no product for this project

## MAXIMUM DAY WATER DEMAND REDUCTION MONITORING AND EVALUATION PROJECT

The objective of this project was to identify and implement a water efficiency measure targeted at reducing maximum day water demands and be responsible for all related costs associated with implementing the identified measure - these costs will depend on the measure selected by each Municipality and the method of implementation used. Preliminary results have been received in draft form. Results show that indoor water consumption was reduced for a number of the conservation methods used. A follow-up study commenced Summer 2001 to determine: impact on outdoor water consumption and whether conservation is maintained over a long period.

**CMHC Project Officer :** Catherine Soroczan, Sandra Baynes **CIDN :** 2341 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

## MAXIMUM DAY WATERING DEMAND PHASE II - ASSESSMENT OF WATER CONSERVATION STRATEGIES

This project's objective is to determine the impact of the Household Guide to Water Efficiency on indoor and outdoor water consumption. Specifically it will seek to address the questions: Is the impact on consumer behaviour maintained in the long term, what effect does the Guide have on outdoor water use during the summer months, and what extra impact does a complementary social marketing campaign have on consumer behaviour. This work is part of the second phase of the Max Day project initiated in 2000, which saw a reduction in consumption rates based on conservation method used. This study is scheduled for completion January, 2002.

**CMHC Project Officer :** Catherine Soroczan, Sandra Baynes **CIDN :** 2341 0200003

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ON-SITE STORMWATER MANAGEMENT ALTERNATIVES

This project's objective was to provide case studies of on-site stormwater management alternatives. These case studies are available on the CMHC water website in case study form.

**STATUS :** Completed

**AVAILABILITY :** Product is available on the web

## ON-SITE WATER QUALITY MONITORING AND CONTROL SYSTEMS

The objective of this project is to identify, through consultation, the requirements and elements of a long-term monitoring and control system for on-site water reuse technologies which will meet health and environmental regulatory needs, etc.

**CMHC Project Officer :** Catherine Soroczan

**CIDN :** 1936 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## PERFORMANCE ASSESSMENT OF LOW FLOW TOILETS

This project's objective is to set up and conduct a monitoring program to verify the flush volumes of Ultra Low Flow (ULF) toilets installed in single-family homes as part of Durham's retrofit program. Initial results indicate that depending on the brand of toilet installed there is a mixed reaction to ultra low flow technology. Report to be available December, 2001.

**CMHC Project Officer :** Catherine Soroczan, Sandra Baynes **CIDN :** 2416 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## REMOTE MONITORING AND CONTROL OF ON-SITE WASTEWATER TREATMENT, RECYCLING AND RE-USE SYSTEMS

This External Research Project addresses remote monitoring and control of systems for on-site wastewater treatment, recycling, and re-use. Effective, reliable, and long-term performance of even the simplest of these systems requires at least periodic monitoring, and the most sophisticated systems require continuous monitoring and control capability.

There are two objectives to this research:

1. To produce a resource document for multi-stakeholders: planners, managers, regulators etc. who have interests or responsibilities related to systems for on-site wastewater treatment, recycling, or reuse; and
2. To produce a supplementary document that will propose ways in which the contents of that document can be communicated most effectively to those users.

**CMHC Project Officer :** Sandra Baynes

**CIDN :** 2437 0200020

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

## WATER QUALITY MONITORING OF THE TORONTO HEALTHY HOUSE

The purpose of this project is to undertake the collection of water samples along various points from the Toronto Healthy House Water Reuse System and have them analyzed for a number of water quality parameters. Monitoring is underway and is scheduled for completion early 2002.

**CMHC Project Officer :** Catherine Soroczan, Sandra Baynes **CIDN :** 2337 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### YOUR SEPTIC SYSTEM. ABOUT YOUR HOUSE; CE34

This six page fact sheet, designed for the consumer, describes how a septic system works and what to do to keep a septic system well maintained and functioning properly. It covers how to know if a problem with a septic system exists by listing some of the warning signs of a failing system, and then outlines actions required to repair it. In addition, the fact sheet describes available alternatives to septic systems.

Ottawa: Canada Mortgage and Housing Corporation, 2001. (*About Your House; CE 34*) 6 pages

NOTE : Aussi disponible en français sous le titre : Votre installation d'assainissement. Votre maison; CF34

**STATUS :** New Completed Fact Sheet

**AVAILABILITY :** CMHC Information Products and available on CMHC's Web site. To download this document visit CMHC's Web site at:  
<http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/index.cfm>

## SOCIO ECONOMIC RESEARCH





## ABORIGINAL HOUSING

### ADAPTATION OF POTENTIAL HOUSING DEMAND MODEL TO ABORIGINAL COMMUNITIES - AN EXAMPLE

This study will build on the results of a feasibility study that looked at the application of CMHC's potential housing demand model in Aboriginal communities. It will take the recommended actions and apply them to a test case of the Nishnawbe Aski Nations (NAN), a grouping of 49 bands in Northern Ontario. Some specific tasks will be: to monitor the degree of difficulty that NAN administrators encounter in gathering accurate input data, to refine the assumptions on headship rates and household types that will be parameters for the model. Eight communities from NAN will be piloted in a first phase, and if successful, the other communities will follow as Phase 2.

**CMHC Project Officer :** Phil Deacon

**CIDN :** N/A

**Division :** Research Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

**\* NEW \***

### ALTERNATE ABORIGINAL TRAINING DELIVERY OPTIONS

Experience over the past several years has shown the need to explore alternate approaches to delivery of training to First Nations (FN) communities and other Aboriginal groups. It is proposed that a small study be launched to look at the feasibility of FN and other Aboriginal groups sharing training expertise and resources by a number of innovative techniques, to supplement the more conventional approach.

One possible model is having a FN community which has already received training or built up expertise on its own, provide a "trainer" to another community to demonstrate and teach the relevant members of the second community. A variation on this would be to have the second community send 1-2 of its members to "shadow" the expert for several days or more to fully learn how to implement a given approach, technology, etc.

The study would examine the various possibilities of training sharing, how logistics could work, what sort of recompense the trainer or "training community" should expect, etc. Such a study holds the promise of extending training delivery resources having effective "hands on" training and supporting capacity development.

**CMHC Project Officer :** Marcelle Gareau

**CIDN :** 01PLO-8426

**Division :** Research Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

### COMMUNICATIONS & INFORMATION TRANSFER STRATEGY FOR ABORIGINAL GROUPS

The goal of this project is to develop a communications and information transfer strategy that will help CMHC in its interactions with Aboriginal housing groups regarding capacity development, research and information transfer activities. To be effective, information has to reach the audience that matters and be in formats that have the maximum impact.

The study looks at the barriers to finding and using housing related information, what makes housing related information relevant, what are key influences, and how effective are the available communications vehicles and distribution channels, all in regard to Aboriginal audiences.

The project consists of: an assessment of existing communication strategies and marketing research in the area of housing information and training; personal or telephone interviews with senior officials of key national and provincial stakeholder groups; group discussions with a broad range of the key client groups as defined in target audiences; and development of alternative communications and information transfer strategies for CMHC and assessment of their relative costs.

## ABORIGINAL HOUSING

The target audience for this project is made up of: key decision makers in housing operations and policies, provincial organizations chosen to give regional coverage, major national organizations, and regional CMHC program officers.

The geographic coverage is Canada wide. All types of Aboriginal community, on or off-reserve in rural, remote and urban communities are included.

**CMHC Project Officer :** Philip Deacon

**CIDN :** 2225 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### **DEVELOPMENT OF A SURVEY INSTRUMENT TO STUDY LINKS BETWEEN LIVING ARRANGEMENTS, HOMELESSNESS AND RESIDENTIAL MOBILITY OF URBAN ABORIGINALS: FINAL REPORT**

This pilot study provides information about how a survey methodology can be used to identify patterns of residential mobility among urban Aboriginal populations. The objectives of this pilot study were to design and test such a survey methodology, not to support statistically significant inferences for Aboriginal populations in urban centres. A questionnaire was developed and tested with a sample of 144 Aboriginal respondents living in two urban centres --Toronto (73) and Winnipeg (71). The sample included respondents from First Nations (96), Métis (40), Inuit (4) and other Aboriginal groups (4). Fourteen Aboriginal organizations in the two selected cities identified respondents, the majority of whom were women, and participated in the survey administration. Information was gathered between November, 1999 and January, 2000 using in-person interviews, telephone interviews and self-administered questionnaires.

Substantive issues dealt with general topics such as residential migration and mobility, frequency and duration of homelessness, current and projected housing needs, empirical linkages and diversity (gender, income, employment, education) of the study population. Survey design issues dealt with Aboriginal consultations, representative pre-testing, literacy and survey administration methods. Respondents took an average of 35 minutes to complete the pre-test version of the questionnaire. The section on Moves (Migration and Mobility) provided the greatest recall challenge for respondents.

The pilot study demonstrated that details of past moves can be tracked, within limits. The survey tracked up to three moves within a five year time period based on respondent recall. Field team reports indicate this horizon may be the practical limit of accurate recall. Some data quality problems were associated with questions such as changes in household type and size. The pilot survey explored the reasons and motivations behind the moves of Aboriginal people living in urban areas --what some experts characterize as "push" and "pull" factors. While very preliminary, the pilot survey results were broadly similar to the results of the 1991 APS which showed that family, employment, housing and education are the major reasons for moving. The pilot survey also successfully identified reasons for moves, using questions or probes to identify different types of housing-related reasons for moves. Reasons differ for in-city (mobility) versus to-city (migration) moves. Housing was a bigger factor for in-city moves while work and education were more important for people moving across city boundaries.

The pilot survey explored in some detail housing-related reasons for moving such as affordability, better quality, and housing that better suits household needs. Cumulatively, these different housing-related factors were identified by almost two-thirds of respondents as underlying their most recent move. This is much higher than the percentage of respondents to the APS who identified housing as a factor in either migration or mobility.

*Prepared by Turtle Island Associates. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Phil Deacon. Ottawa: CMHC, 2000. 92 pages*



## ABORIGINAL HOUSING

NOTE: No. 88 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

### EFFECTS OF URBAN ABORIGINAL RESIDENTIAL MOBILITY AND SERVICE PROVISION

This project will examine the effects of Aboriginal urban mobility upon service provision in areas such as housing, education, and health care in both the private and public sectors. The project is aimed at examining the effects of Aboriginal urban mobility upon the provisions of services to Aboriginal people in Winnipeg and Regina.

**CMHC Project Officer :** Marcelle Gareau

**CIDN :** 2436 0200

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### EXAMINING INUIT SPACE USE IN EURO-CANADIAN HOUSE FORMS

This project is intended as the initial phase of a long term investigation of Inuit spatial behaviour in Euro-Canadian house forms.

**CMHC Project Officer :** Marcelle Gareau

**CIDN :** 2437 0200019

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

### FIRST NATIONS HOUSING PROPERTY MANAGEMENT TRAINING COURSES AND RESOURCES

This project's objective is to undertake and complete the identification and assessment of First Nations housing property management training courses and resources and provide recommendations for a comprehensive curriculum and innovative approaches to delivery in remote communities.

**CMHC Project Officer :** Jim Rockwood (ABC)

**CIDN :** 2374 1500001

**Division :** Assisted Housing Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

### INTERCULTURAL COMMUNICATION OF CMHC INFORMATION PRODUCTS TO THE ABORIGINAL POPULATION

A project will be implemented in order to determine which existing information products are relevant to Aboriginal communities' housing goals. The relevant material will then be reviewed in order to ensure that the presentation of the information is appropriate and accessible to members of Aboriginal communities. The project may include the conceptual reformatting of some existing products if deemed necessary. Relevant material will then be disseminated in a variety of ways such as information mail-outs, faxes and could include the development of an Aboriginal web site on CMHC's web page.

**CMHC Project Officer :** Marcelle Gareau

**CIDN :** N/A

**Division :** Research Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

### RESEARCH AND CONSULTATION PROJECT CONCERNING INUIT HOUSING ACROSS CANADA: FINAL REPORT

The purpose of this project was to develop a more current understanding of housing problems and priorities in Inuit communities, investigate and identify "best practices", and develop a housing strategy which will include innovative new means of financing and alternative forms of housing, recognizing that there is no funding for new housing commitments off-reserve through Canada Mortgage and Housing Corporation (CMHC). The project was jointly funded by CMHC and the Department of Indian Affairs and Northern Development.

*Prepared by the Inuit Tapirisat of Canada. CMHC Project Officer: Line Gullison. Ottawa: Canada Mortgage and Housing Corporation, 2001. 52 pages*

NOTE : Aussi disponible en Inuktitut et en français sous le titre : *Projet de recherche et de consultation sur le logement des Inuits au Canada : rapport final*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### URBAN ABORIGINAL MOBILITY COLLOQUIA/WORKSHOPS/SURVEY PLANNING

The 2001 work is preparation for a possible survey in 2002 that will be definitive in terms of measuring detailed mobility of urban Aboriginal households. This activity will involve:

- 1) a project to develop an action plan for a quantitative study of mobility and the necessary resources (funding, partners, access to data, etc.)
- 2) a series of workshops and colloquia will be held to generate interest and commitment on the part of potential funding partners of the survey.

**CMHC Project Officer :** Marcelle Gareau

**CIDN :** N/A

**Division :** Research Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

**\* NEW \***

## ABORIGINAL HOUSING

### URBAN ABORIGINAL PERCEPTIONS OF ACCESS TO HOUSING

The objectives of this project are:

- 1) To obtain baseline data on the nature and extent of discrimination in housing that Aboriginal people experience - case studies focus on Winnipeg and Thompson, Manitoba.
- 2) To quantitatively and qualitatively examine the key variables associated with housing discrimination for Aboriginal people, including such factors as residential migration/mobility, social cohesion, and ethnic clustering.
- 3) To explore the effect that discrimination in housing for Aboriginal people has with regard to other victimization. This will be done by comparing the housing related factors to a more general survey of victimization (National Community Victimization Project) being carried out by Simon Fraser University with a SSHRC grant.

**CMHC Project Officer :** Phil Deacon

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 1990 0200001

**STATUS :** Ongoing

**\* NEW \***

**\*\* SEE ALSO:** p. 13-14

## CHILDREN'S ENVIRONMENTS

### HOUSING CANADA'S CHILDREN

This study looks at children and the families in which they are raised, in the context of their environments. It presents a number of facts about Canadian households with children that describe their make up, the types of housing in which they live and their tenure arrangements. It also draws attention to the probable links between housing environments and children's development outcomes.

Overall, the findings of this study suggest that most children in Canada are raised in good housing environments. Eighty-five per cent of households with children lived in dwellings that were affordable, were in good repair and had enough bedrooms for the number and mix of household members, or they could have afforded to rent dwellings meeting these standards. However, the other 15% of households with children were in core housing need and they experience problems of affordability, housing disrepair and/or over-crowding. Furthermore, lone-parent households, family households that rented their accommodation and households with children with disabilities or Aboriginal identity were particularly susceptible to living in core housing need.

In 1996, two-parent households spent on average 21% of their income on shelter costs. In contrast, lone-parent households spent 34% of their income for shelter, which is higher than the norm for affordability and fewer of them lived in single-family housing units than in 1976. Households that spend more than the norm for their shelter - in terms of dollar amounts and the proportion of their incomes - are left with less to spend on other areas including food, transportation, recreation, children's clothing, education and reading, and child care. These items in general support healthy child development.

The study also shows that housing disrepair and crowding bear a relationship to child development outcomes. The potential exists for detrimental long-term effects on children raised in crowded dwellings in disrepair. The findings suggest that these children are more at risk of poor health, asthma, poor school performance, aggressive behaviours and trouble with the law. For example, 89% of children in sufficient housing were in excellent health compared to only 72% of children in crowded housing in disrepair, an outcome that underlines the importance of good housing environments for healthy development.



## CHILDREN'S ENVIRONMENTS

Prepared by Canadian Council on Social Development. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 2000. (Distinct Housing Needs Series) 34 pages

Order number: 62209

NOTE 1 : Aussi disponible en français sous le titre : Le logement des enfants au Canada

NOTE 2 : No. 55-4 in the Research Highlights Socio-Economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS** : Completed Report and Research Highlight

**AVAILABILITY** : CMHC Information Products

## HOUSING FORM AND QUALITY IN RELATION TO CHILDREN'S MENTAL HEALTH

This External Research Project (ERP) will examine whether housing form and quality are related to the socio-emotional health of children. It will use standardized measures of housing quality and mental health, two major housing forms (single family and low-rise cluster), and will consider the role of various potentially moderating influences, including socioeconomic status and indoor population density to answer the basic question: "How, if at all, does housing form and quality affect the socio-emotional health of urban Canadian children".

**CMHC Project Officer** : Fanis Grammenos

**Division** : External Research Program

**AVAILABILITY** : Product is not yet available

**CIDN** : 2437 0200013

**STATUS** : Ongoing

**\* NEW \***

## CITY PLANNING AND HUMAN SETTLEMENTS

### ASSESSING THE FULL COSTS OF WATER, LIQUID WASTE, ENERGY AND SOLID WASTE INFRASTRUCTURE IN THE FRASER VALLEY REGIONAL DISTRICT

This project was conducted for CMHC by The Sheltair Group Inc. in order to demonstrate the benefits of using full-cost accounting tools and techniques to evaluate the social, economic, and environmental costs and impacts of urban growth. Using the Fraser Valley Regional District (FVRD) in British Columbia as a case study, a two-part project was conducted. The project resulted in the development of a methodology and an associated software tool for compiling and analysing detailed infrastructure profiles, and then using these profiles to assess the full costs of different growth scenarios. The report is organised in two parts: Part 1 provides background information about the FVRD, and presents a methodology specific to the Regional District. Part 2 describes the development of the software tool, and presents results of the application to the FVRD.

Prepared by The Sheltair Group Inc. and the International Centre for Sustainable Cities (Sustainable Cities Foundation). Prepared for: Research Division, Canada Mortgage and Housing Corporation; Planning Department, Fraser Valley Regional District, Growth Strategies Office, Ministry of Municipal Affairs. CMHC Project Officer: Doug Pollard. Ottawa: Canada Mortgage and Housing Corporation, 2000.

NOTE: No. 85 in the Research Highlights Socio-Economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS** : Completed Report and Research Highlight

**AVAILABILITY** : Canadian Housing Information Centre

## CONCEPT OF A QUALITY LOCATION AND THE CENTRAL DISTRICTS OF MONTRÉAL

The primary scope of the proposed research will be to develop an approach based on sustainable development and aimed at better evaluating the capacities of an urban area to enhance its living conditions. In so doing, we believe that the proposed approach will support any measures to establish more effective guidelines for the improvement of these capacities.

**CMHC Project Officer :** Paul Cardinal  
**Division :** External Research Program  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2437 0200008  
**STATUS :** Ongoing  
**\* NEW \***

## IMPLEMENTING THE OUTCOMES OF THE SECOND UNITED NATIONS CONFERENCE ON HUMAN SETTLEMENTS (HABITAT II): CANADA'S RESPONSE = MISE EN OEUVRE DES MESURES ADOPTÉES LORS DE LA DEUXIÈME CONFÉRENCE DES NATIONS UNIES SUR LES ÉTABLISSEMENTS HUMAINS (HABITAT II) : RAPPORT DU CANADA

The Second United Nations Conference on Human Settlements, Habitat II, was held in Istanbul, Turkey in June 1996. Habitat II brought together representatives from 171 countries to discuss an issue of global concern: shelter and human settlements in a rapidly urbanizing world. The countries participating in Habitat II adopted the "Habitat Agenda", a commitment by the world's nations to improve living conditions in the world's cities, towns, and villages.

In June 2001, five years after Habitat II, the General Assembly of the United Nations held a special session, popularly known as Istanbul + 5, to review and appraise implementation of the "Habitat Agenda" worldwide. In preparation for this session, countries were invited to report on implementation of the Agenda. The United Nations Centre for Human Settlements (UNCHS) has developed reporting guidelines for use in the preparation of the national reports.

In response to the UNCHS invitation, Canada has prepared this Country Report, based upon a series of six Technical Reports. Part of this report focuses on qualitative and quantitative data addressing a series of identified indicators. These indicators are intended to measure progress relative to a number of commitments and recommendations in the Habitat Agenda. Canada's indicators data has been provided, where possible, for Canada as a whole and for each of five major urban areas: Vancouver, Calgary, Toronto, Montreal, and Halifax.

The main body of this report is divided into seven sections: an introductory overview, and six thematic chapters as requested by the UNCHS:

- Overview: The Canadian Approach
- Chapter 1: Shelter
- Chapter 2: Social Development and Eradication of Poverty
- Chapter 3: Environmental Management
- Chapter 4: Economic Development
- Chapter 5: Governance
- Chapter 6: International Cooperation.

Within each chapter, five subsections provide the following information:

- The first subsection addresses the identified indicators for the topic of the chapter.
- The second and third subsections provide an overview of key federal and provincial government initiatives relevant to the topic of the chapter. The information contained in these subsections was obtained via surveys of federal and provincial agencies.
- The fourth subsection summarizes selected municipal/local best practices relating to the topic of the chapter. The examples presented have all been independently evaluated as best practices through the mechanism of the UNCHS Best Practices Program and Database.
- The final subsection is a synthesis of stakeholder views on the topic of the chapter, derived from a series of interviews and reflecting a diversity of viewpoints on a number of key issues.

## CITY PLANNING AND HUMAN SETTLEMENTS

The Quebec Report was prepared by the Government of Quebec. It reviews the implementation of the Habitat Agenda in Quebec from the provincial perspective, and may be found in the Annex.

Canada Mortgage and Housing Corporation (CMHC) assumed overall responsibility for preparation of this report, with assistance from an Interdepartmental Steering Committee. Marbek Resource Consultants Ltd. undertook all research and writing, with contributions from Greg Lampert, Economic Consultant. Extensive assistance was provided by Statistics Canada and Environment Canada for the indicator data. Many other federal and provincial agencies provided information and input, as did a range of stakeholders. Provinces and territories that contributed to the development of the Country Report include Ontario, Quebec, New Brunswick, Manitoba, British Columbia, Prince Edward Island, Alberta, Saskatchewan, Newfoundland, and Nunavut.

Ottawa: Canada Mortgage and Housing Corporation, 2001. ca 320 pages

Text in English and in French.

Order number: 62321

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products and  
[http://www.cmhc-schl.gc.ca/en/search\\_results.cfm](http://www.cmhc-schl.gc.ca/en/search_results.cfm)

## REQUALIFICATION OF SUBURBS AND REGULATORY FRAMEWORKS : CURRENT SITUATION

The objectives of this study are, first, to analyze the current regulatory frameworks that could support proposals for the requalification of Quebec suburbs and, second, to propose measures that could be introduced to make it easier for these districts to adapt to the social and physical changes that they are undergoing.

**CMHC Project Officer :** Philippe LeGoff  
**Division :** External Research Program  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2437 0200018  
**STATUS :** Ongoing  
**\* NEW \***

## CONSUMER PROTECTION

### ISSUES PAPER ON LIABILITY IN HOUSE CONSTRUCTION

This project's objective is to produce a paper discussing the issue of liability in housing construction across Canada and identify who is and is not liable.

**CMHC Project Officer :** Mark Holzman  
**Division :** Research Division  
**AVAILABILITY :** Product is not yet available

**CIDN :** 1920 0200001  
**STATUS :** Ongoing



## CANADIAN HOUSING AND RENEWAL ASSOCIATION RESEARCH PROJECT ON BOARD RENEWAL

Non profit boards have found themselves under increasing strain in recent years, and within the non profit housing sector many boards find themselves in need of renewal and rejuvenation. This project looks at the issues and how boards face the challenges. The study was done in incremental phases involving: a literature search; interviews with boards in other sectors that have undergone board renewal, followed by interviews with non-profit housing boards; and, three case studies of non-profit housing boards experiences.

Experiences, approaches and tools are detailed throughout the body of the report, with Section 6.0 providing a summary of observations, key conclusions, symptoms of board fatigue or dysfunction, preventive action, and available resources.

*Prepared by Urban Aspects Consulting Group Ltd. Prepared for Canadian Housing and Renewal Association for Canada Mortgage and Housing Corporation. Ottawa: Canada Mortgage and Housing Corporation, 2000. 55 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## COST OF CO-OPERATIVE HOUSING

The purpose of this project is to conduct a study of the cost of co-operative housing.

**CMHC Project Officer :** Graham Murray

**CIDN :** 2439 0501001

**Division :** Audit and Program Evaluation Services

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

## CRISIS SITUATIONS IN COOPERATIVES: INCREASING UNDERSTANDING TO IMPROVE INTERVENTION

This research project concerns crisis situations in housing cooperatives: the conditions in which they emerge, but especially the dynamics put in place to resolve them.

**CMHC Project Officer :** Marie Murphy

**CIDN :** 2018 0200001

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PUBLIC HOUSING TENANT SELF-MANAGEMENT: AN EVALUATION OF THE ALEXANDRA PARK CO-OP CONVERSION PROCESS IN TORONTO

The purpose of this project is to produce an independent review and analysis of the conversion process that has taken place at Alexandra Park/Atkinson Co-op.

**CMHC Project Officer :** Vernon Barkwell

**CIDN :** 2305 0200020

**Division :** Research Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

## IMPACT OF THE HOME BUYERS' PLAN ON THE DECISION TO BUY A HOME

This study is aimed at gaining an understanding of the impacts of the Home Buyers' Plan (HBP) on housing demand. It will clarify the following:

- Is the HBP a valid tool to facilitate access to homeownership?
- For which households is the HBP particularly worthwhile?
- What is the financial impact of RRSPs, especially on the issue of the best strategy between reducing mortgage debt or making RRSP contributions?
- If households use the HBP but do not repay their RRSP, will this jeopardize their long-term financial security?

**CMHC Project Officer :** Ian Melzer  
**Division :** External Research Program  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2437 0200006  
**STATUS :** Ongoing  
**\* NEW \***

## HOMEOWNERSHIP EDUCATION AND COUNSELLING: AN EXAMINATION OF U.S. EXPERIENCE AND ITS RELEVANCE FOR CANADA

The purpose of this research project was to examine the American experience with a view to identifying ways of enhancing affordable, sustainable access to homeownership in Canada. In carrying out the U.S. segment of this research, in addition to conducting a literature review, a survey of homeowner education and counseling (HEC) providers and participants was conducted together with follow-up interviews. For the Canadian portion of the research, a broad range of housing and community organizations (180 in total) were surveyed and follow-up interviews conducted in order to develop a portrait of existing homeownership access support services in Canada.

The first part of the report provides a comprehensive summary and evaluation of the HEC experience in the U.S. Following a synopsis of the historical evolution of HEC, the report outlines the characteristics of HEC programs, services and delivery agencies; responses from HEC industry participants surveyed; how HEC is funded as well as recent developments affecting the HEC industry; specifically the establishment of the American Homeowner Education and Counseling Institute (AHECI), the increased focus on standardizing program content and delivery as well as the certification of HEC providers. Next, the report describes the role that HEC has had in addressing credit, affordability, psychological, cultural and linguistic access barriers to homeownership and is followed with a summary of the statistical studies, research and anecdotal evidence assessing the efficacy of HEC both in facilitating access to homeownership as well as in mitigating mortgage loan default risk. This section of the report concludes by summarizing the results of the US HEC industry expert survey in such areas as: the future of HEC and its key factors of success; why industry leaders are so interested in HEC; and outlines respondents' comments on introducing HEC-type initiatives elsewhere.

The second part of the report examines the access support services and delivery structures existing in Canada to help households access homeownership. It examines information and/or access gaps which indicate the need for enhancing homeowner education and counseling efforts in Canada. The results of a national survey examining the nature, scope and operation of existing homebuyer education and counseling efforts in Canada are then presented followed by an assessment of the differences between what is offered in the U.S. vis-a-vis Canada in addressing access barriers to homeownership. The section of the report concludes by examining whether the gaps in services available in Canada might be filled by introducing HEC-style initiatives that draw on best practices used in the U.S. under the auspices of a housing sector-driven public-private partnership arrangement.

## HOME OWNERSHIP

Prepared by Hirshhorn Consulting Inc. and George McCarthy. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: David Metzak. Ottawa: CMHC, 2000 (Housing Affordability and Finance Series) (162 pages)

Order number: 62173

NOTE 1: Aussi disponible en français sous le titre : Services de formation et de consultation pour l'accession à la propriété : examen de l'expérience américaine et de sa pertinence pour le Canada (PF 0435)

NOTE 2: No. 68 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** CMHC Information Products

### METHODS USED ABROAD TO SUPPORT ACCESS TO HOMEOWNERSHIP: A RESEARCH SURVEY: FINAL REPORT

This report examines the possibility that one or more measures adapted by governments or industry in other countries in recent years has the potential to improve access to homeownership in Canada. Although every country is, in some respects, unique in the way that housing and accommodation are produced and delivered, there are broad similarities between Canada and a number of other advanced market economies: notably Australia, Britain, France, Germany, New Zealand, and the United States. This report focuses specifically on measures (programs, policies, or practices) employed or contemplated in these six nations over the past decade by governments and the private sector. The report asks whether these measures have the potential to improve access to homeownership in Canada, or extend the benefits of homeownership to under served portions of our population. This report does not consider innovations in residential construction itself (e.g., land subdivision and planning, construction technology and building codes, or house design) as these are subjects of other studies. This report will be of interest to the construction and renovation industry, the real estate sector, mortgage lenders and insurers as well as public sector housing policy analysts.

Prepared by John R. Miron with contributions by Axel Borsch-Supan, Donald R. Haurin, Patric H. Hendershott, Anne Laferrère, John MacCormick, John N. J. Muellbauer, Marion Steele, and Judith Yates. CMHC Project Officer: David Metzak. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2001. 147 pages

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## HOMELESSNESS

### APPLICABILITY OF A CONTINUUM OF CARE MODEL TO ADDRESS HOMELESSNESS

This project will examine the applicability to Canada of a continuum of care (CoC) model by conducting in-depth case studies of the CoC model in four American communities. The project will analyze the benefits and limitations of each CoC program and review its applicability in addressing homelessness in Canadian urban centres.

**CMHC Project Officer :** Anna Lenk

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2353 0200001

**STATUS :** Ongoing



## CHILDREN AND YOUTH IN HOMELESS FAMILIES: SHELTER SPACES AND SERVICES

"Children and Youth in Homeless Families: Shelter Spaces and Services" provides a snapshot of how local communities across Canada meet the needs of homeless children and youth and their parents or guardians.

This research study involved a review of existing data and literature and two surveys of Canadian shelters. After the first screening survey, the second survey was administered to 112 shelters from large urban areas in most regions of the country.

While the findings may not be statistically representative of geographical regions or type of shelter, they highlight many interesting facts about the homeless children and youth who live in shelters with their families. For example, at the time of the study, over half of the children and youth were under the age of five, and problems with self-esteem and a sense of well-being were common. Not surprisingly, the families who used the shelters had no earned income and many relied on social assistance to meet their everyday needs.

The survey also examined the availability and adequacy of the shelters and their services. Overcrowding was a common problem, while the ability to provide facilities and services such as study areas, indoor and outdoor recreation areas, child care and counseling for children and youth depended on the type of shelter. More family violence shelters than general emergency or municipal shelters provided these facilities and services to their clientele.

The availability of services for parents such as job training, employment searches and on-site medical or legal services was also low in the general emergency shelters but higher in the family violence shelters and municipal programs.

The survey also asks where do homeless families go when they leave the shelters? The results indicate that most moved to their own apartment or house, while a much smaller number moved to another shelter, a rooming house or motel, or stayed with friends or moved to another city. Only a very small percentage lived on the streets.

Most of the families needed financial assistance and affordable housing to ensure a stable household for their children and youth. They also required counseling in life skills, child care and training and employment skills. Different shelters employed various strategies to meet these needs, ranging from home visits and follow-ups to help with budgeting and advocacy.

These are just a few of the insights obtained by this research study. But further research is recommended to provide a comprehensive inventory of the number, size and location of all the shelters serving homeless families with children and youth, and the types of services they provide. Also recommended for further study is an investigation of the health and long-term emotional effects that living in an emergency shelter has on children and youth.

*Ottawa: Canada Mortgage and Housing Corporation, 2000. 117 pages*

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

NOTE: No. 80 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

## ENVIRONMENTAL SCAN ON YOUTH HOMELESSNESS

This report is a comprehensive examination of youth homelessness across Canada. It provides an overview of the homeless youth population, including their shelter situation; the primary housing and support issues related to homeless youth; and the types of effective housing and service interventions that have benefited this need group. It focuses primarily on youth between 16 and 24 years of age, is national in scope and provides detailed information about youth homelessness in every province, the Northwest Territories, Yukon and Nunavut.

The Scan was researched in two steps. The first step was a review of the existing Canadian literature on youth homelessness and the preparation of an annotated bibliography. The second step consisted of interviews with close to 60 key informants across the country, including representatives from all levels of government and front-line community agencies.

The Scan provides an overview of the initiatives to address youth homelessness that are happening at national, provincial or local levels and identifies a number of expanded and additional programs and services that could help alleviate youth homelessness. They include more affordable housing, and a range of additional housing options such as emergency shelters, transition housing and supported housing. There is growing interest in programs that offer youth a full range of housing choices linked with support programs, such as life skills and pre-employment training.

Other suggestions for supporting homeless youth include improved access to income assistance, access to the child welfare system for 16 year olds, more mental health services, treatment for addictions, alternative schooling options and initiatives to help youth find jobs. Family mediation, conflict resolution, strategies to help youth remain in school, more recreation centres, and more support to families and children are also recommended as part of the continuum of supports for helping homeless youth.

*Prepared by Deborah Kraus, Margaret Eberle and Luba Serge. CMHC Project Officer: Jim Zamprelli.  
Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2001.*

NOTE: No. 86 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

## GOVERNANCE IN LOCAL PARTNERSHIPS TO ADDRESS HOMELESSNESS

This research will identify tools and strategies for problem-solving and decision-making within complex partnerships. This will be done by examining methods and structures of collaboration at the local level among community-based agencies and municipal governments, working on homelessness issues, using case studies.

**CMHC Project Officer :** Anna Lenk

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2426 0200

**STATUS :** Ongoing

## HOMELESS INDIVIDUALS AND FAMILIES INFORMATION SYSTEM (HIFIS)

In order to help shelters and municipalities develop useful and comparable information on homeless people, in 1995 CMHC began a program of research to develop the Homeless Individuals and Families Information System (HIFIS) as a user-friendly software application. HIFIS was designed by and for shelters throughout the country to meet their administrative operating requirements while at the same time collecting information that will provide quality data on homeless shelter clients. Municipalities will also benefit greatly from the use of HIFIS. By identifying the number and characteristics of homeless people served in shelters in their jurisdiction, many municipalities will, for the first time, gain a basic understanding of the homeless population in their region. As a result, local governments will be able to better plan, monitor and evaluate policies and programs designed to reduce the problem of homelessness.

In 2000, CMHC pilot tested the software in over 100 shelters in 8 of Canada's largest municipalities located all across Canada. After almost six years of research and development, CMHC has now passed the HIFIS system over to the National Secretariat on Homelessness to take it from being a pilot tested software to being an operational system with support available across Canada. HRDC intends that HIFIS assist local agencies throughout the country.

**CMHC Project Officer :** John Engeland  
**Division :** Research Division

**CIDN :** 2295 0200003  
**STATUS :** Completed

## HOUSING NEEDS OF LOW-INCOME PEOPLE LIVING IN RURAL AREAS

This project is intended to be a preliminary investigation of the housing needs of low-income people living in rural areas, including the existence of homelessness. The methodology includes a statistical profile, mainly from the Census, but supplemented by any surveys which have been done by the provinces/territories and by qualitative research to more finely identify issues affecting very low income or otherwise vulnerable households.

**CMHC Project Officer :** Anna Lenk  
**Division :** Research Division  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2367 0200  
**STATUS :** Ongoing

## HOUSING STABILITY AND MENTAL ILLNESS

The objective of this project is to evaluate the effectiveness of programs to promote housing stability for the mentally ill population at risk of homelessness. The research will look at a sample of programs and service providers in order to answer the question of which interventions and which factors most effectively help this population to access and, more importantly, maintain stable housing. Examples of housing-related interventions are supportive housing, residential care, support service agreements with private or social housing landlords, transitional housing, respite care, discharge planning, housing help and mediation services, and crisis response.

**CMHC Project Officer :** Anna Lenk  
**Division :** Research Division  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2290 0200  
**STATUS :** Ongoing



## HOMELESSNESS

### INVOLVING CLIENTS IN ADDRESSING HOMELESSNESS

This research project will explore and document methods that have successfully involved the homeless and formerly homeless population (including the various sub-populations of homeless people such as families, young people, women, Aboriginal people, persons with disabilities, people with mental illness and addictions, elderly people, refugees, and new immigrants) in:

- assessing their various housing-related needs;
- determining effective housing interventions;
- participating in the development of housing interventions;
- participating in the ongoing management and operation of housing projects; and
- project evaluation.

Project results will form the basis of a how-to guide on methods to involve homeless and formerly homeless people in determining and implementing housing solutions.

**CMHC Project Officer :** *Jim Zamprelli*

**CIDN :** 2395 0200

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### STUDY OF TENANT EXITS FROM HOUSING FOR CHRONICALLY HOMELESS PEOPLE

This project's objective is to study the current residents and the recent evictees from a Toronto agency that has a long history of providing innovative housing and related services for the chronically homeless and 'hard to house'. It is a study of the users of the services provided by the agency, not the agency itself.

**CMHC Project Officer :** *Anna Lenk*

**CIDN :** 2305 0200013

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*\* SEE ALSO:** Innovative Housing for Homeless Youth, p. 129

## HOUSE CONSTRUCTION INDUSTRY

### HOUSING CONSTRUCTION INDUSTRY: CHALLENGES AND OPPORTUNITIES FOR THE 21ST CENTURY

This research project will examine the evolution of the structure of the housing industry in Canada since the mid-1980s, the industry's current and expected future challenges in the period to 2010, and the ways it might adapt. The study will also identify research issues which merit further investigation and study.

**CMHC Project Officer :** *Ian Melzer*

**CIDN :** 1987 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

# HOUSE CONSTRUCTION INDUSTRY

## INDUSTRY PROFILE OF CANADIAN LIGHT STEEL BUILDING

This research will provide an overview of the current Canadian lightweight steel framing industry.

**CMHC Project Officer :** Jessica Li

**CIDN :** 2431 0900002

**Division :** Canadian Housing Export Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

## SKILL SHORTAGES IN THE RESIDENTIAL CONSTRUCTION INDUSTRY

This paper looks at why labour shortages arise and persist, the possible consequences of labour shortages, the tools available to manage labour supply and demand, policy implications and future research requirements.

*Rev. edition. Prepared by Morley Gunderson, MKG Associates. CMHC Project Officer: David D'Amour. Ottawa: Canada Mortgage and Housing Corporation, 2001. 125 pages*

**NOTE:** No. 76 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

## STUDY ON THE HOUSING SECTOR'S PRODUCTIVITY GROWTH

The objectives of this project are to measure the residential construction sector's productivity, assess the productivity drivers in the sector and, where feasible, by housing type, explain the productivity trends and explain the regional variations.

**CMHC Project Officer :** Eric Tsang

**CIDN :** 2406 0100001

**Division :** Strategic Policy & Planning

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

**\*\* SEE ALSO:** Technology Dissemination: Triggering Innovation Adoption in Canada's Home Construction Industry, p. 48

# HOUSING

## HOUSING IN CANADA (HIC) CD-ROM DATA BASE

CMHC has developed an electronic CD data base called Housing In Canada (HIC) which provides housing interest groups with direct hands-on access to comprehensive data on households and housing conditions using CMHC's custom 1996 housing conditions indicators data derived from the 1996 Census and comparing it with data from the 1991 Census. The data base enables groups to have the hands-on capability to examine how and why housing conditions are changing.

HIC presents key demographic and socio-economic data (e.g. household type, income, age, gender and period of immigration) matched to comprehensive housing data (e.g. dwelling type, age and condition; tenure, shelter cost, suitability, affordability and the existence and depth of housing need).

## HOUSING

HIC employs today's recognized standards for housing suitability, adequacy and affordability to facilitate the assessment of the state of Canada's housing.

The software profiles most of Canada's households: non-farm, non-Native; non-farm, Native off-reserve; Native on-reserve; and farm households. HIC includes aggregated data for: Census Metropolitan Areas (CMAs) and main sub-divisions (CSDs); Regional Municipalities; residual non-CMA urban and urban areas; and provinces, territories and Canada. The data provided focuses on 1996, but provides comparison data for 1991 to enable users to identify the direction and extent of recent changes in a community's housing.

The bilingual 20/20 software (included) is available in the form of easily manageable CD-ROM disks; for each province and territory, and for each census metropolitan area (CMA). Each provincial/territorial CD-ROM contains Canada level data on it to provide context for all analyses. Similarly, each CMA CD-ROM contains two sets of all CMA average data for comparison; one set for the province in which the CMA is located and the other for all of Canada.

**STATUS :** Completed

**AVAILABILITY :** Further information on HIC is available from CMHC's web site:  
<http://www.cmhc-schl.gc.ca/mkrinfo/housingincanada.html>

## IDENTIFICATION OF GAPS IN DISASTER INFORMATION RELATED TO HOUSING

This short survey project will assemble and review existing housing information related to 'disasters' to assess if and where additional research may be required. The review will concentrate on housing and housing issues, and will be restricted to either Canadian sources or other sources in areas of similar climate or construction techniques. The contractor will assess the suitability of the information for the intended audience and identify gaps in the current consumer information.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2417 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## INTERGENERATIONAL HOUSING TRENDS AND CHALLENGES

This project's objective is to complete an issue paper on intergenerational housing trends and challenges.

**CMHC Project Officer :** Leanne Elliott

**CIDN :** 2409 0100001

**Division :** Strategic Policy & Planning

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available



## HOUSING

### SPECIAL STUDIES ON 1996 CENSUS DATA

This project is composed of developing a series of concise studies that explore the housing conditions reported in the 1996 Census of Canada. Seven studies are currently completed and available on the CMHC web site:

- Research Highlights Issue 55-1 Canadian Housing Conditions uses data primarily at the national level, explains commonly used terminology, and examines the largest groupings of households.
- Research Highlights Issue 55-2 Housing Conditions in Metropolitan Areas examines Canada's 25 Census Metropolitan Areas.
- Research Highlights Issue 55-3 Housing Conditions of Immigrants discusses the housing conditions of households whose primary maintainer is an immigrant to Canada.
- Research Highlights Issue 55-4 Housing Canada's Children examines the housing environment of Canada's children.
- Research Highlights Issue 55-5 Changes in Canadian Housing Conditions, 1991-96 examines changes in the housing conditions of non-farm, non-Native households between the 1991 and 1996 Censuses.
- Research Highlights Issue 55-6 Housing Conditions of Native Households examines the housing conditions of households defined as Native using the self-identification definition available in the Census for the first time in 1996.
- Research Highlights Issue 55-7 Canadian Households in core housing need and spending at least half their income on shelter, profiles the characteristics of these Canadian households which in 1996 constituted under 7% of the 9.8 million households studied, or about 38% of the 1.7 million households in core housing need.

Subsequent studies are planned to examine smaller groupings of interest, such as: seniors; people who live alone; families; tenants; women; and young people.

**CMHC Project Officer :** Ian Melzer

**Division :** Research Division

**AVAILABILITY :** Research highlight is available

**CIDN :** 1988 0200003

**STATUS :** Ongoing

## HOUSING AFFORDABILITY

### ACT REGIONAL STAKEHOLDER INFORMATION SESSIONS

Ten information sessions will be held across Canada to inform housing stakeholders of regulatory reform solutions that have been generated under the Affordability and Choice Today program. The intent is to encourage replication of these solutions. Stakeholders will include municipalities, home builders, non-profit housing groups and other housing specialists. Forums have been held in Saint John, Halifax, Quebec, Montreal, Toronto, Winnipeg, Saskatoon, Vancouver and Victoria.

**CMHC Project Officer :** Susan Fisher

**Division :** Research Division

**AVAILABILITY :** There will be no product for this project

**STATUS :** Ongoing

## AFFORDABLE HOUSING ADVISOR

This project will assemble an electronic database of strategies that have been successfully used to improve housing affordability. These strategies will appear under categories of activity such as: Policy and Regulation; Housing and Community Design; Financing and Tenure; Construction and Technology; Operations and Management; and Redevelopment. Each strategy will be explained and illustrated with two example projects. The database will be accessible through the CMHC web site and will be fully searchable and linked to relevant sources of information of the strategies and examples. The sources will include CMHC reports, publications by other organizations and individuals and web sites of public, non-profit and non-government organizations. This database would be a virtual encyclopedia on affordable housing tools.

**CMHC Project Officer :** Fanis Grammenos

**CIDN :** 2053 0200004

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## COCHRANE, ALBERTA, COMMUNITY-BASED AFFORDABLE HOUSING INITIATIVE, PLANNING AND ENGINEERING SERVICES DEPARTMENT, TOWN OF COCHRANE, ALBERTA = INITIATIVE DE LOGEMENTS À PRIX ABORDABLE DE LA VILLE DE COCHRANE (ALBERTA), SERVICE DE L'URBANISME ET DU GÉNIE, VILLE DE COCHRANE (ALBERTA)

The objective of this project was to develop affordable housing policies that could be incorporated into the town of Cochrane, Alberta, Land Use Bylaw and to develop a set of guidelines for implementation of the policies by town planners in conjunction with the development industry.

The Cochrane Town Council amended its Land Use Bylaw to

- allow accessory (secondary) suites and garden suites;
- increase densities in all residential zoning categories;
- to create a new zoning category for multiples taller than four storeys; and the Town Council adopted a replacement Municipal Development Plan that incorporated new policies that addressed requirements for housing choice availability.

By the summer of 1999, Cochrane was seeing positive results from the affordable housing project and the resultant regulatory reforms.

*Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2000. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 48 pages*

Order number: 62000

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

## GUIDE TO DEVELOPING A MUNICIPAL AFFORDABLE HOUSING STRATEGY

A municipal affordable housing strategy is a systematic approach to addressing local housing issues. It provides the community with an opportunity to discuss housing in its broad social development context and reach a consensus (or at least a widely-supported decision) on what should be done in order to ensure that housing needs are being met. By undertaking a municipal affordable housing strategy, the community can inventory the available resources for dealing with housing issues, weigh the broad range of actions open to them, assign responsibility for action to municipal and community based agencies and identify those actions and policy changes that they will demand from senior levels of government. An affordable housing strategy is developed with public consultation throughout the process.

The purpose of this guidebook is to give municipalities interested in adopting an affordable housing strategy a detailed account of how to go about doing so. The chapters in the Guidebook are arranged along functional lines, meaning that different aspects of the strategy development process are described as separate topics. These functional topics are:

- preparation and administrative set-up
- assess affordable housing needs
- planning and conducting a public participation process
- developing action plans
- implementing the strategy
- building partnerships
- monitoring and evaluation of outcomes

*Prepared by Ray Tomalty, Anna Hercz, and Christine Warne. CMHC Project Officer: Fanis Grammenos. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2001. 85 pages.*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## PHILANTHROPIC SUPPORT FOR AFFORDABLE HOUSING: FINAL REPORT

This research project is aimed at providing sponsors of affordable housing with a detailed situational analysis background overview of the philanthropic sector. The study includes an overview of the financial economics associated with producing affordable housing in Canada; an examination of the charitable sector and donor community; and a look at the tax implications of donations to charities and non profit organizations. The report describes the nature, characteristics and regional variations in charitable giving in Canada; sources of charitable donations and funding levels as well as alternative fund raising methods used to solicit financial support. This component of the research also provides an overview of the nature, size and characteristics of the donor community in Canada and presents practical insights into the size, nature, geographic distribution and related factors impacting donations from individual Canadians, the corporate community and foundations. Sixteen case studies are used to illustrate how affordable housing sponsors have been able to obtain philanthropic support for creating affordable housing projects.

*Prepared by Manifest Communications Inc. in association with Steve Pomeroy, Focus Consulting and François Lagarde. CMHC Project Officer: David Metzak. Ottawa: Canada Mortgage and Housing Corporation, 2000. (Housing Affordability and Finance Series) ix, 134 pages.*

Order Number: 62146

NOTE 1: Aussi disponible en français sous le titre : Appui des organisations philanthropiques à la production de logements abordables (PF 0436)

NOTE 2: No. 67 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** CMHC Information Products



## HOUSING AFFORDABILITY

### REFINING OF CMHC HOUSING AFFORDABILITY INDICATORS

The purpose of this project is to undertake a study to refine CMHC housing affordability indicators.

**CMHC Project Officer :** Louis Trottier

**CIDN :** 2320 1000001

**Division :** Market Analysis Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### STATE AND PROVINCIAL AFFORDABLE HOUSING MANDATES AND MEASURES

The objective of this project is to identify and describe affordable housing mandates and measures being used by various states in the U.S. and provinces in Canada which essentially encourage their municipalities to use the regulations associated with the development approval process, but without financial subsidies, to encourage the private sector to provide affordable housing. The final report will be of interest to provincial and municipal planners, housing analysts, finance officers, and third sector housing providers.

**CMHC Project Officer :** David A Metzak

**CIDN :** 1670 0200003

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING AND IMMIGRATION

### HOUSING CHOICE AND ADAPTABILITY FOR AFRICAN REFUGEES: THE CANADIAN AFRICAN NEWCOMER AID CENTRE, TORONTO (ONTARIO) = CHOIX ET ADAPTABILITÉ DES LOGEMENTS DESTINÉS AUX RÉFUGIÉS AFRICAINS : THE CANADIAN AFRICAN NEWCOMER AID CENTRE, TORONTO (ONTARIO)

This report describes the work of the Canadian African Newcomer Aid Society of Toronto (CANACT), to develop an adaptable housing model for refugees which would take into consideration the unique needs of refugees, including the changes likely to occur in family size and composition through family reunification. Formally called "Housing Choice and Adaptability for Refugees", the project was undertaken in cooperation with Toronto's Department of Housing and the Department of Planning and Development. The project set out to:

- consult with African refugees to determine their present and future housing needs;
- translate these needs into design guidelines;
- identify regulatory issues relevant to the creation of such housing; and
- acquire land and build a demonstration project of 16 units.

Although the CANACT project never achieved its ultimate goal of actually building homes or developing a viable ownership model, it produced a blueprint that other housing providers can use to develop their own housing projects for new immigrants and refugees. The City of Toronto's study of the zoning implications of CANACT's design guidelines can also be useful to other municipalities as it identifies the kind of permitted use categories needed to accommodate the housing needs of African refugees and newcomers.

## HOUSING AND IMMIGRATION

Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study)

Order Number: 61993

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

### METROPOLIS CENTRES OF EXCELLENCE FOR RESEARCH ON IMMIGRATION ISSUES

CMHC and other federal departments provide ongoing financial support to stimulate and support policy-relevant research on immigration issues, through a network of research centres in Canadian universities. Information on Metropolis and on the almost 200 funded research projects can be found at <canada.metropolis.net>.

**CMHC Project Officer :** Thomas Parker

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2224 0200001

**STATUS :** Ongoing

**\* NEW \***

### STUDY ON THE RESIDENTIAL INTEGRATION OF IMMIGRANT YOUTH IN MONTRÉAL

The purpose of this project is to study and propose solutions to the problem of integrating immigrant youth in Montréal.

**CMHC Project Officer :** Tom F Kerwin

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2316 0200001

**STATUS :** Ongoing

## HOUSING EXPORT OPPORTUNITIES

### ASSESSMENT OF PREFABRICATED BUILDING SYSTEMS INDUSTRY

This study will research the prefabricated building industry in Sweden and Finland.

**CMHC Project Officer :** Louis Musto

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 1979 0200002

**STATUS :** Ongoing

### CANADA POLAND RESIDENTIAL REAL ESTATE INVESTMENT MODEL: AN EVALUATION OF POLAND'S RESIDENTIAL REAL ESTATE MARKET: SUMMARY

This evaluation of Poland's residential real estate market provides information on the following:

- An economic overview
- Foreign investment regulations
- Residential construction
- The property market
- The legal framework for a housing financing system
- Development prospects
- An Investment model
- Construction permits, the Polish standardization system, and custom duties
- Types of housing systems preferred by Polish consumers
- Business practices and useful contacts.

Ottawa: *Canada Mortgage and Housing Corporation, Canadian Housing Export Centre, 2001. 21 pages.*

Note: Publié aussi en français sous le titre : Étude de marché dans le secteur de l'immobilier résidentiel

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### CONTRIBUTION TO A STUDY ON PACIFIC RIM MARKETS FOR TERMITE-RESISTANT WOOD PRODUCTS

The objective of this project is to study the Pacific Rim markets for termite-resistant wood products.

**CMHC Project Officer :** Jay Thakar

**CIDN :** 2104 0900001

**Division :** Canadian Housing Export Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### DEVELOPMENT OF A GUIDE TO THE UNITED KINGDOM BUILDING REGULATIONS

The objective of this project is to develop a guide on the building regulations in the United Kingdom.

**CMHC Project Officer :** Terry Robinson

**CIDN :** 1953 0900

**Division :** Canadian Housing Export Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### DEVELOPMENT OF AN EXPORT TOOL-KIT FOR CHINA

This project's objective is to prepare a comprehensive assessment and collection of information pertaining to the export of Canadian housing product to China.

**CMHC Project Officer :** Murray Rasmussen

**CIDN :** 2347 0900001

**Division :** Canadian Housing Export Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



### FACILITATING THE PENETRATION OF CANADIAN COMPANIES INTO THE CHILEAN HOUSING SECTOR: EXECUTIVE SUMMARY

The main purpose of this study is to provide an efficient tool for the penetration of Canadian companies into the Chilean housing sector. This document compiled, analyzed, identified and took note of the best strategies and prospects for successful entry of Canadian prefabricated housing and construction products.

The main objectives of this market study are:

- To describe the Chilean industrialized housing sector
- To identify opportunities for Canadian exporters of these types of housing units
- To identify actual and future real estate development projects where CMHC member companies could participate
- To propose market penetration strategies for each of the main Canadian construction products and the prefab housing sector.

*Prepared by Faraggi & Satler S.A. Ottawa: Canada Mortgage and Housing Corporation, 2001. 27 pages*

NOTE: Publié aussi en français sous le titre : Favoriser l'implantation des entreprises canadiennes au sein du secteur chilien de l'habitation

**STATUS :** New Completed Report

**AVAILABILITY:** Canadian Housing Information Centre and available in PDF file on CMHC's Web site. To download this document visit CMHC's Web site at :  
[http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu\\_012.cfm](http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu_012.cfm)

### HOUSING AND BUILDING MARKET IN CHILE, CHINA, GERMANY, JAPAN, KOREA, POLAND, UNITED KINGDOM

For each of the countries listed above, this report provides the following information:

- quick facts on the country
- characteristics of its housing and building products market
- building technology standards
- building codes and standards
- information on the business environment, domestic and foreign competition, market entry strategies and specific business opportunities
- key contacts, events, references, and internet sources of information.

*Prepared for Canada Mortgage and Housing Corporation. Prepared by Department of Foreign Affairs and International Trade. Ottawa: Canada Mortgage and Housing Corporation, 2001.*

Publié aussi en français sous le titre : Le marché du logement et de la construction en : Allemagne, Chili, Chine, Corée, Japon, Pologne, Royaume-Uni

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## HOUSING MARKET GUIDES ON FOUR CITIES IN THE UNITED STATES

This project's objective is to prepare individual Market Guides for four cities in the United States: Boston, Chicago, Dallas, and Seattle.

**CMHC Project Officer :** Sanjar Farzaneh

**CIDN :** 2466 0900001

**Division :** Canadian Housing Export Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## INVESTIGATION OF CO-VENTURES AND EXPORT POTENTIAL FOR BUILDING PRODUCTS AND MATERIALS RELATED TO SUSTAINABLE DEVELOPMENT IN CHINA

The purpose of this project is to explore the opportunities that exist in China for co-ventures and the export of Canadian products, technology and materials related to sustainable development to lower the impact on the natural environment and/or promoting a healthy indoor environment.

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Export Centre

## PENETRATION OF THE MULTIPLE HOUSING SECTOR IN THE UNITED STATES

This document is intended to be used as a reference tool by prime contractors and trade contractors alike working in the contractual construction industry and who envision expanding their business into the United States. The purpose of this study is to identify the ten American metropolitan regions that offer the highest potential concerning residential real estate, particularly apartment complexes, and the ten metropolitan regions of the eastern United States that offer the highest potential for non-residential real estate. The study also outlines the methods used by the current exporters to bypass any barriers to entry.

*Prepared by Claire Piché and Samir Abboud of COPRIM. Prepared for Canadian Housing Export Centre, Canada Mortgage and Housing Corporation and Association de la construction du Québec. CMHC Project Officer: Carol M. Kerley. Ottawa: CMHC, 2000.*

**NOTE :** Aussi disponible en français sous le titre : Pénétration du secteur de l'habitation multiple aux États-Unis

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre and available in PDF file on CMHC's Web site. To download this document visit CMHC's Web site at :  
[http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu\\_001.cfm](http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu_001.cfm)

## RESEARCH STUDY ON THE HOUSING MARKET IN THE UNITED KINGDOM

This report describes the housing market in the United Kingdom, providing an overview of the market, statistics on newly built housing, and information on its housing technology. It covers the major challenges facing UK housing and outlines the building technology and standards environment. The final section deals with the key issues concerning imported housing and products to the UK, trading relationships, and recommended market entry strategies for Canadian housing companies. A typical performance specification for timber frame use in the UK is included.

*Ottawa: Canadian Housing Export Centre, Canada Mortgage and Housing Corporation, 2000. 52 pages*

NOTE : Aussi disponible en français sous le titre : Étude sur le marché de l'habitation au Royaume-Uni

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## STUDY ON U.S. RENOVATION MARKET

This study covers recent changes, trends, and opportunities for the renovation market in the United States. It includes an overview of the market, forecasts and detailed lists of the top American remodeling companies, independent lumber yards and home centres, leading retailing chains, home improvement product retailing headquarters, wholesaling cooperatives, distributors, representatives and agents.

*Prepared by The Starr Group Inc. Prepared for Canadian Housing Export Centre, Canada Mortgage and Housing Corporation. CMHC Project Officer: Carol M. Kerley. Ottawa: CMHC, c1999.*

NOTE : Aussi disponible en français sous le titre : Étude sur le marché de la rénovation aux États-Unis

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## TRENDS AND CHANGES IN JAPANESE BUILDING REGULATIONS

To facilitate the development of export strategies for the Japanese housing market, this report provides information on new government regulation in Japan and the effect of these regulations on imported housing. The report provides an in-depth assessment of the four key issues driving the sweeping changes taking place in Japan's housing industry: Revised Building Standard Law, mandatory 10 year product warranties, Housing Quality Assurance Law (HQAL), and new Government Housing and Loan Corporation (GHLC) criteria.

*Prepared by David Cohen and Christopher Gaston. Ottawa: Canada Mortgage and Housing Corporation, c2001. 43 pages.*

NOTE : Aussi disponible en français sous le titre : Tendances et changements au niveau des règlements de construction japonais

**STATUS :** Completed Report

**AVAILABILITY :** Available in PDF file on CMHC's Web site. To download this 43 page document visit CMHC's Web site at  
[http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu\\_010.cfm](http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu_010.cfm)



## HOUSING EXPORT OPPORTUNITIES

### TRENDS IN THE JAPANESE HOUSING MARKET

Japan is one of the world's largest housing markets. Canada is a leading exporter of building materials and services to Japan and has actively promoted the use of Canadian housing systems through a variety of initiatives. Imports of housing, however, comprise only a small proportion of total Japanese housing activity so the potential to expand this market share presents attractive opportunities for Canadian housing producers and suppliers. This report provides:

- an overview of recent trends in the Japanese housing market and housing imports;
- an assessment of market opportunities for Canadian housing companies in Japan; and
- identifies a number of potential market niches including: large-scale wooden buildings; exterior finishes on buildings in quasi-fire protection areas; energy-efficient and healthy housing; housing for the elderly; and the renovation market.

*Prepared by Greg Lampert Economic Consultant and Shin Ikehata, Cyber Builders International Inc.  
Prepared for Canadian Housing Export Centre, Canada Mortgage and Housing Corporation. Ottawa:  
CMHC, 1999, c2000. 66 pages*

NOTE : Aussi disponible en français sous le titre : Tendances du marché de l'habitation japonais

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre and available in PDF file on CMHC's web site. To download this document visit CMHC's web site at : [http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu\\_001.cfm](http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu_001.cfm)

## HOUSING FORECASTING AND DEMAND

### DEMOGRAPHIC CHANGES AND REAL HOUSING PRICES IN CANADA

With the aging of the baby-boom generation, the number of young households is falling in Canada. This study examines the contentions of the demographer David Foot, and of earlier work by Mankiw and Weil, that in such a population, the number of home buyers is bound to decrease, causing the prices of residential real estate to drop substantially. In addition to reviewing the relevant economic literature, it constructs econometric models using Canadian national and provincial data and uses them to assess whether expected demographic changes in Canada are likely to trigger a pronounced downward trend in residential real estate prices. The study concludes that even if it is true that demographics may exert downward pressure on real estate prices, such impact will probably be dominant only in certain regions, depending even there on their rates of growth in real income. In other regions, the real price should have a tendency to rise.

*Prepared by Mario Fortin and André Leclerc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Ian Melzer. Ottawa: CMHC, 1999, c2000. (Housing Affordability and Finance Series) 142 pages*

Order Number: 62152

NOTE 1: Aussi disponible en français sous le titre : Les changements démographiques et le prix réel des logements au Canada

NOTE 2: No. 62 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** CMHC Information Products

## HOUSING FORECASTING AND DEMAND

### ESTIMATION OF CORE HOUSING NEED USING THE SURVEY OF HOUSEHOLD SPENDING MICROFILE

This External Research Program project is aimed at developing a methodology for tracking housing conditions and need between censuses using the latest (1999) Survey of Household Spending (SHS) file. The contractor will carry out research at Statistics Canada with the internal SHS working file to examine how to apply CMHC's indicators for housing affordability, adequacy, and suitability and the integrated indicator of core housing need to the SHS. The contractor will, in the process, identify and examine the nature of any problems associated with small SHS sample size, suggesting workarounds where possible, at the same time as evaluating the longer term potential to expand the survey sample.

**CMHC Project Officer :** John Engeland

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2437 0200016

**STATUS :** Ongoing

**\* NEW \***

## HOUSING MARKET

### ASSESSMENTS OF EFFECTS OF GRAIN ELEVATOR CLOSURES IN SASKATCHEWAN

This project's objective is to evaluate the effects of closures (and restructuring) of grain elevators recently announced by the Saskatchewan Wheat Pool.

**CMHC Project Officer :** Gary MacDonald

**Division :** Market Analysis Centre

**AVAILABILITY :** Product is not yet available

**CIDN :** 2118 1000001

**STATUS :** Ongoing

**\* NEW \***

### IMPACT OF CONVERSIONS OF RENTAL TO OWNERSHIP UNITS ON HOUSING MARKETS IN ONTARIO

This study seeks to generate a framework for addressing the changes in the availability of affordable housing stock in large Ontario cities through conversions of rental units and, by extension to understand the impact of these conversions on other components of the housing market, in particular the new homes market.

**CMHC Project Officer :** Alain Miguez

**Division :** Market Analysis Centre

**AVAILABILITY :** Product is not yet available

**CIDN :** 2226 1000001

**STATUS :** Ongoing

### ETHNIC CHANGES AND THE HOUSING MARKET IN RIVIÈRE-DES-PRAIRIES, MONTRÉAL

This project's objective is to provide an understanding of the residential building depreciation mechanism in order to find out the share of the effects of ethnicity in relation to the general economic conditions prevailing on the market in Rivière-des-Prairies, Montréal.

**CMHC Project Officer :** Philippe LeGoff

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2437 0200007

**STATUS :** Ongoing

**\* NEW \***

## EVOLVING IMPACT OF E-COMMERCE ON HOUSING FINANCE ACCESS AND AFFORDABILITY: US EXPERIENCE AND LESSONS FOR CANADA

The objective of this research is to examine the significant changes arising in the housing finance market place resulting from e-commerce and their impact on housing finance access and housing affordability. An overview of experience to date and international comparisons with the US will be instructive to Canadian stakeholders and will assist in developing and focusing a program of useful related directed research.

The research project will entail a literature review, Internet searches, interviews and discussions with knowledgeable US and Canadian industry participants, government regulatory agencies, housing sector stakeholders and other key informants.

**CMHC Project Officer :** Ian Melzer

**CIDN :** 2389

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## LONG-TERM OUTLOOK ON THE DEMAND FOR MORTGAGES IN CANADA: SUMMARY REPORT

Due to slower demographic growth, new housing construction will decline over the next two decades. In addition, because the baby boomer generation is aging, this demographic growth will be concentrated in the older segments of the population. The demand for mortgages will therefore undergo the combined effects of a decrease in the household formation rate and, since the older population is generally wealthier, a better capacity to finance home purchases with equity. This research is aimed at establishing the effects of these demographic changes on the demand for mortgages in Canada. The first part presents a review of the principal known theoretical and empirical results on the demand for mortgages. Then, the determinants of the number of mortgages, their average value and the total outstanding of these loans are studied using an econometric model. Finally, this model is applied to a series of projections to determine the future trends that will affect the Canadian residential mortgage market.

*Prepared by Mario Fortin and André Leclerc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Ian Melzer. Ottawa: CMHC, 2000. (Housing Affordability and Finance Series Research Report) 18 pages*

Order number: 62275

NOTE 1 : Aussi disponible en français sous le titre : Perspectives à long terme de la demande de prêts hypothécaires au Canada : rapport sommaire

NOTE 2: No. 51 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** CMHC Information Products



### EVALUATION OF THE MEASUREMENT OF HOUSING NEED IN NORTHERN AND REMOTE COMMUNITIES

The report evaluates the appropriateness of the current approach - the core housing need concept - for measuring housing need in Canada's northern and remote areas. It also examines other approaches as well as potential enhancements to the existing approach that may result in a better assessment of need in the North. It finds that the ideal measurement approach and data bases to support it would be too costly and that even improvements to the existing approach, to better take into account depth or severity of need, would increase measurement costs. It concludes that although the core need model has its weaknesses, it is as adequate a model as one can achieve to provide regular estimates of need in a cost effective manner.

*Prepared by the Institute of Urban Studies. CMHC Project Officer: John Engeland. Prepared for Research Division, Canada Mortgage and Housing Corporation, 1999, c2001. (Housing Affordability and Finance Series Research Report) 95 pages*

Order number: 62319

Note: Aussi disponible en français sous le titre : Évaluation de la mesure des besoins de logement dans les collectivités nordiques et éloignées

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

**\*\* SEE ALSO:** Technical Northern Housing Secion, p. 57-62

## PERSONS WITH DISABILITIES

### DETERMINING THE EFFORT NEEDED BY ADULTS AND SENIORS TO CLIMB RAMPS USING MANUAL WHEELCHAIRS

This study concerns an analysis of the necessary physical requirements to go up access ramps in manual wheelchairs.

**CMHC Project Officer :** Luis Rodriguez

**CIDN :** 2305 0200019

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### EXAMINATION OF THE HOUSING CHOICES OF PERSONS WITH DISABILITIES

This project's objective is to have accurate information on the housing choices of people aged 15 and over with mobility and agility disabilities.

**CMHC Project Officer :** Thomas Parker

**CIDN :** 2144 0200019

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### HOME IS WHERE THEIR WHEELS ARE: THE HOMEMAKING AND HOUSING EXPERIENCES OF MOTHERS WHO USE WHEELCHAIRS FOR FULL-TIME MOBILITY

This project's objectives were to investigate how physically disabled mothers who are full time wheelchair users define, give meaning, and perform household activities within the social and spatial contexts of their homes. Eleven mothers who used wheelchairs for full-time mobility were interviewed concerning the ways in which they had accommodated to or modified their physical and social environments in order to fulfill homemaking and mothering responsibilities. Mothers described social and environmental facilitators and challenges to caring for themselves, their homes and families. Housing accessibility, wheelchair design, and attendant care had effects on their household and caregiving activities and experiences. Further, the manner in which mothers obtained, trained, and used various types of human and mechanical assistance was both a honed skill and sources of significant, and continuous stress. There are implications for care providers, housing planners and wheelchair designers to improve the quality of life for women with disabilities and their families.

*Prepared by Denise Reid, Jan Angus, Patricia McKeever, and Karen-Lee Miller. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Tom Parker. Ottawa: CMHC, 2001. (External Research Program Report) ca. 78 pages.*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### HOUSING CONDITIONS OF PERSONS WITH HEALTH AND ACTIVITY LIMITATIONS IN CANADA, 1991: A RETROSPECTIVE

This study provides, for the first time, an overall perspective on the general housing conditions of Canadians with health and activity limitations. Being a retrospective, it is based on data from the 1991 Census of Canada linked to the post-censal Health and Activity Limitations Survey (HALS). By comprehensively profiling housing conditions in 1991, the study forms a foundation for work that CMHC plans to do in linking data from the 2001 Census of Canada with the subsequent Health and Activity Limitations Survey.

The conclusions of the study are:

- Persons with disabilities are significantly more likely than other Canadians to be in core housing need, especially those who rent, are moderately or severely disabled, live alone, or are women or single mothers.
- Many need housing adaptations related to their disability but cannot afford them.
- Nonetheless, the great majority are satisfied with their present dwelling. Even most of those seeking change would prefer to adapt their current homes rather than move.

*Based on research by Aron Spector, Ark Research Associates for John Engeland, Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, c2000. (Distinct Housing Needs Series Research Report) ix, 24 pages.*

Order number: 62026

NOTE 1 : Aussi disponible en français sous le titre : Conditions de logement des personnes aux prises avec des problèmes de santé et des limitations d'activité au Canada, en 1991 : Rétrospective

NOTE 2 : No. 58 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** CMHC Information Products

## PERSONS WITH DISABILITIES

### MAJOR MAINTENANCE AND RESIDENTIAL RENOVATION: A SURVEY OF MEANS TO IMPROVE THE ARCHITECTURAL ACCESSIBILITY OF EXISTING BUILDINGS

The objective of this project is to study the extent to which it is possible to integrate architectural accessibility into existing residential buildings during major maintenance or common renovation work planned by an owner.

**CMHC Project Officer :** *Rachelle Luengas*

**CIDN :** 2021 0200001

**Division :** External Research Program

**STATUS :** Ongoing

Research Division

**AVAILABILITY :** Product is not yet available

### SPACE EFFICIENT UNIVERSAL DESIGN INNOVATIONS

The research will evaluate design innovations which have been developed specifically to enhance access for people who use wheelchairs.

**CMHC Project Officer :** *Thomas Parker*

**CIDN :** 2009 0200001

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## POPULATION HEALTH

### DEVELOPMENT OF A RESEARCH FRAMEWORK FOR POPULATION HEALTH AND HOUSING

The National Housing Research Committee is interested in the possible links between housing and health status at the population level. This project begins to address the lack of comprehensive research in the area. More specifically, it will summarize what is known using existing literature reviews, recent unreviewed literature, and current work underway. Based on this, the project will: develop a theoretical framework using accepted concepts and definitions where they exist, assess the difficulties of research in this area and identify areas with most promise, assess institutional research capacity for mounting a program of research in this area, and write a research proposal, for submission to a funding body, whereby NHRC could partner.

**CMHC Project Officer :** *Phil Deacon*

**CIDN :** 2489 0600001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

\* NEW \*



### **ACTION PLAN FOR REVITALIZING A COMMERCIAL ARTERY: COLLECTIF EN AMÉNAGEMENT URBAIN HOCHELAGA-MAISONNEUVE, MONTRÉAL, QUÉBEC = PLAN D'ACTION POUR LA RVITALISATION D'UNE ARTÈRE COMMERCIALE : COLLECTIF EN AMÉNAGEMENT URBAIN HOCHELAGA-MAISONNEUVE, MONTRÉAL, QUÉBEC**

Hochelaga-Maisonneuve is a neighbourhood located in the east end of Montréal, Québec. In the fall of 1996, an umbrella group of local community organizations, the Collectif en aménagement urbain Hochelaga-Maisonneuve, received an A.C.T. grant in order to identify ways to revitalize a once vibrant section of Ste-Catherine Street in the southwestern part of the Hochelaga-Maisonneuve district. The project had three main objectives:

- modify zoning bylaws to encourage neighbourhood revitalization;
  - improve the neighbourhood's image by minimizing factors that are driving away investment and people; and
  - encourage property owners to participate actively in improving their community.
- Specifically, the project team undertook the following activities:
- updated the study area's land-use maps;
  - consulted with municipal housing authorities, local business associations and community groups; and;
  - prepared a revitalization plan.

This A.C.T. initiative identified obstacles to revitalization found in the zoning bylaw as well as other factors contributing to the area's decline.

*Case study written by: Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2000. (Affordability and Choice Today (A.C.T.) Demonstration Project; ACT Case Study)*

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

### **AUSTRALIAN BUILDING REGULATION AND LIABILITY REFORMS: AN UPDATE**

This report builds on, and complements, the 1999 report "Australian Building Regulation and Liability Reforms". It examines the experience of home builders with the new building regulatory system, reviews the regulatory regime being established in the state of Tasmania, and assesses how the information gathered might affect the adoption of similar reforms in Canada.

*Prepared by Greg Lampert. Prepared for Canadian Home Builders' Association and Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2000. (Healthy Housing and Communities Series) 53 pages*

Order number: 62158

**NOTE :** Aussi disponible en français sous le titre : Réformes de la réglementation australienne de la construction et des dispositions en matière de responsabilité: Le Point

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

### **BRINGING COMPUTERS INTO THE PERMITTING PROCESS, STRATHCONA COUNTY, ALBERTA = AUTOMATISATION DU PROCESSUS D'ÉMISSION DE PERMIS, STRATHCONA COUNTY (ALBERTA)**

This report describes the process followed by Strathcona County to develop a computerized permit processing system and data base, integrated with the existing tax roll and assessment data base. The objective of the project was to reduce red tape and streamline the application and approval process for development and building activities. Results achieved are documented and lessons for other municipalities considering a similar initiative are covered.

*Case study written by: Rowena E. Moyes. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2000. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 30 pages*

Order Number: 61992

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

### **HOW CAPE BRETON REGIONAL MUNICIPALITY STREAMLINED RESIDENTIAL BUILDING PLANS APPROVALS BY IMPROVING THE QUALITY OF PLANS SUBMITTED FOR REVIEW: FIRE-RESCUE AND BUILDING SERVICES DEPARTMENT OF THE CAPE BRETON REGIONAL MUNICIPALITY, NOVA SCOTIA = COMMENT LA MUNICIPALITÉ RÉGIONALE DU CAP-BRETON A RATIONALISÉ L'APPROBATION DES PLANS DE CONSTRUCTION RÉSIDENIELLE EN AMÉLIORANT LA QUALITÉ DES PLANS PRÉSENTÉS POUR FINS D'EXAMEN : SERVICES DES INCENDIES ET DU BÂTIMENT DE LA MUNICIPALITÉ RÉGIONALE DU CAP-BRETON, NOUVELLE-ÉCOSSE**

This report describes how the Cape Breton Municipality took a different approach to streamlining its residential building permit approval process. Where others focussed on relaxing standards or reorganizing their bureaucracy for greater efficiency, Cape Breton put its emphasis on the front-end of the system. It decided to improve the quality of the plans coming in for review.

The solution adopted by the Region was a training program to teach home builders and their designers how to complete and submit plans that are consistently code correct. Graduates of the course would be certified as "code-qualified" and plans submitted by them would require only a low-level review, meaning they could clear the system faster. For all practical purposes, their plans would arrive pre-approved.

Cape Breton conducted a trial run of its program in 1996 and began full implementation in the 1997 building season. The Region's average processing time for applications from "code-qualified" applicants has dropped to six days compared to an average of 14 days for the non-certified.

The Cape Breton experience can be easily duplicated and other municipalities could expect to reap the same benefits as Cape Breton. Staff would spend less time reviewing building plans and handling permit fee payments at a counter, so they would be free to do other work. The work environment for inspectors would improve because there would be fewer conflicts with builders over code violations.

There are also benefits for builders. They pay less to have their plans reviewed and significantly reduce the possibility of having to make expensive job-site corrections when inspectors spot code violations during construction.

## REGULATORY REFORM

Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1998 (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 32 pages

Order Number: 61997

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

### HOW THE DISTRICT OF NORTH VANCOUVER BUILT COMMUNITY ACCEPTANCE FOR THE LEGALIZATION OF SECONDARY SUITES IN SINGLE FAMILY NEIGHBOURHOODS = COMMENT LE DISTRICT DE NORTH VANCOUVER EN EST VENU À FAIRE ACCEPTER PAR LA COLLECTIVITÉ LA LÉGISLATION DES APPARTEMENTS ACCESSOIRES DANS LES QUARTIERS CONSTITUÉS DE MAISONS INDIVIDUELLES

This case study describes how the District of North Vancouver built community acceptance for the legalization of secondary suites in single family neighbourhoods. Secondary suites meet a market requirement for low-rent housing, they are a form of urban intensification and they address various needs (mostly financial) of home owners. In spite of these benefits, there is real and perceived community resistance to secondary suites. This opposition is built upon apprehensions that suites adversely affect neighbourhood quality of life and that the people who inhabit them may not be the kind of folks you want living next door. After unsuccessful efforts to close down secondary suites, the municipality decided to try a different approach. The District exposed and deflated the mis-perceptions of residents and suite owners by publishing and promoting four factual documents that:

- profiled owners of secondary suites and their tenants showing how they compared to the rest of the population;
- analysed the cost factors involved in upgrading existing suites to make them building code-compliant, concluding that \$10,000 to \$15,000 was a typical outlay;
- examined the types of complaints the District received about secondary suites as justification for putting appropriate controls in place; and
- examined the Provincial building code issues involved.

These 4 documents were circulated to builders and developers and to 22 community and ratepayer groups for comment. In addition, the District staged a televised public forum on the issue to obtain input from the public at large. In the end, the District achieved what it wanted -- widespread community acceptance that secondary suites serve genuine needs and therefore deserve a place in the housing mix. The by-law Council passed in October 1997, to legalize secondary suites in single family zones reflected public input. It demands sufficient space for parking, requires that owners live in the home and that there be only one suite per house. District of North Vancouver officials think their experience can benefit other municipalities. The process they used, particularly the research methodology, could be followed by others. Asked what they learned from their experience that could help others, District officials cite three key points:

1. provide the public with factual information based on solid research;
2. find common ground (in this case, consensus focused on health and safety issues); and
3. adopt a non-punitive approach.

Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 37 pages

Order number: 61991

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products



### **INCREASING HOUSING IN RURAL COMMUNITY CENTRES, BEAUBASSIN PLANNING COMMISSION, CAP-PELÉ, NEW BRUNSWICK = LA DENSIFICATION RÉSIDENTIELLE DANS LES CENTRES COMMUNAUTAIRES RURAUX, COMMISSION D'AMÉNAGEMENT BEAUBASSIN, CAP-PELÉ (NOUVEAU-BRUNSWICK)**

This ACT case study briefly outlines the unrestrained development in rural areas of New Brunswick that was threatening the province's natural resources and creating unsustainable communities. It documents the work of the Beaubassin Planning Commission on behalf of the Beaubassin East Rural Community to examine ways to control sprawl and enhance community life in rural areas. The key to increasing residential density in non-serviced rural areas was to identify alternative ways to treat wastewater in a manner that protects the environment and maintains health standards. The Planning Commission:

- conducted research on innovative types of sewage and storm-water drainage systems
- assessed the feasibility of installing shared or community septic systems to dispose of wastewater; and
- recommended modifications to provincial regulations so as to permit increased densities in non-serviced rural community centres.

As a result of these regulatory changes, property owners in designated community centres can now build a single-family home on a 2000 square metre lot, one-half the previous minimum lot size. The revised zoning bylaw also permits the construction of a second building on a 4,000 square metre lot containing a single-family home. The report outlines how the new zoning regulations enable the Beaubassin East Rural Community to offer a wider range of affordable housing and increase both the speed and flexibility of the development approval process.

*Case study written by: Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 34 pages*

Order Number: 61995

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

### **ONE-STOP APPROVAL FOR MINOR RESIDENTIAL RENOVATIONS, ANDRÉ FORTIN, ARCHITECT, MONTRÉAL, QUEBEC = PROJET D'AUTORISATION INSTANTANÉE POUR LES TRANSFORMATIONS RÉSIDENTIELLES MINEURES, ANDRÉ FORTIN, ARCHITECTE, MONTRÉAL (QUÉBEC)**

This report describes the work of André Fortin to improve the permit issuance process for minor residential renovation projects in the City of Montréal. This type of renovation project is frequently undertaken by the property owner without the assistance of a building professional and sometimes without a permit. In doing so, construction safety and quality, and architectural integration are adversely affected. Most homeowners lack the specialized technical knowledge required to prepare the plans and specifications that must be submitted to receive a building permit. Homeowners are often unfamiliar with the approval process, which can be complicated and lengthy, and some find little technical support available to them.

André Fortin, a local architect, was awarded an A.C.T. grant to develop a series of technical guides that help homeowners in the City of Montréal prepare permit applications for minor residential renovations. Separate guides were created for different types of renovation projects such as:

## REGULATORY REFORM

- converting basements to apartments;
- minor additions or interior renovations that would provide additional housing; and
- renovations that make the existing living space accessible to persons with disabilities.

The guides contain sample designs as well as advice on regulations in force and the scope of construction work required. The guides, as well as meetings with municipal staff, provide homeowners with technical support, reduce the documentation required, and speed up the approval process for minor residential renovation projects. This encourages good quality renovation work that complies with existing municipal regulations and reduces administration costs.

The report includes a sample technical guide for building a deck and a sample application form for a basement unit dwelling. The technical guides are a useful reference for all Canadian municipalities using National Building Code regulations.

*Case study written by: Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999. (Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project; ACT Case Study) 32 pages*

Order Number: 61999

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

### **SURREY'S USE OF INTERACTIVE TOUCH-SCREEN TECHNOLOGY TO EXPEDITE CLIENTS REQUESTS FOR BUILDING PERMIT AND DEVELOPMENT PROCESS INFORMATION: THE CITY OF SURREY PLANNING AND DEVELOPMENT DEPARTMENT = UTILISATION DE LA TECHNOLOGIE INTERACTIVE À ÉCRAN TACTILE PAR LA VILLE DE SURREY AFIN D'ACCÉLÉRER LE TRAITEMENT DES DEMANDES DE PERMIS DE CONSTRUIRE ET D'INFORMATION SUR LE PROCESSUS D'AMÉNAGEMENT : SERVICE D'URBANISME ET D'AMÉNAGEMENT DE LA VILLE DE SURREY**

This case study report documents the use of touchscreen and computer technology by the City of Surrey, B.C. so individuals seeking information about land development and building permit policies can serve themselves. The City says its Touchscreen Info-Centre helps streamline permit handling and enhance customer service. Since delays in construction cost money, the kiosks serve the cause of housing affordability by making permit issuance procedures more efficient. The methodology used to create them could be easily emulated by any other municipality.

*Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2000. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study)*

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

## REGULATORY REFORM

### SURVEY OF CANADIAN MUNICIPALITIES: REGULATORY MEASURES FOR HOUSING AFFORDABILITY AND CHOICE

Through a survey of 110 Canadian municipalities, this study collects information on the status of regulatory reforms aimed at increasing housing affordability and choice. The survey also identifies housing-related issues considered to be key priorities by municipalities. The research resulted in a final report and research highlight and will be of interest to municipalities, builders, non-profit housing groups and housing professionals.

*Prepared by Spurr Research Associates; CitySpaces Consulting Limited, Luba Serge et Associés, and Fuller Information. CMHC Project Officer: Susan Fisher. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2001. ca. 166 pages*

NOTE: No. 87 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

## RENOVATION AND INSPECTION

### DISINVESTMENT AND THE DECLINE OF URBAN NEIGHBORHOODS

The project aims to develop an understanding of the forces and factors that trigger or accelerate neighborhood decline; create a consensual framework for action that can stem or reverse the housing decline spiral; ascertain the role of investment in housing as a primer for regeneration and identify opportunities for concrete action involving partnerships. Three cities that have experienced inner neighborhood decline and three that have successfully prevented decline are used as the basis for the analysis. Lessons are drawn about strategies or mechanisms that can arrest decline before it becomes a self-reinforcing spiral.

**CMHC Project Officer :** Fanis Grammenos

**CIDN :** 2124 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RENTAL HOUSING

### ANALYSIS OF PENSION AND RRSP INVESTMENTS IN CANADIAN RENTAL HOUSING

This study assesses whether Canadian registered pension plans (RPPs) and retirement savings plans (RRSPs) currently under-invest in rental housing, and if so, whether there are specific obstacles to investment and policy options that would potentially increase investment. The study methodology involves an integrated approach consisting of five elements:

- a review of the legislative and regulatory environment;
- a synthesis of the theoretical and empirical literature on modern portfolio theory;
- a survey of pension funds and money managers;
- a comparative assessment of the Canadian/U.S. environments and results; and
- a quantitative analysis of rental housing investments by RPPs/RRSPs.



## RENTAL HOUSING

The primary focus of the study is on equity investments. The study finds that RPPs/RRSPs hold only minuscule amounts of rental housing investments. The evidence presented indicates that there is substantial scope for increasing RPP/RRSP investment in rental housing, assuming current obstacles can be removed. Any significant boost in the flow of such savings to rental housing could substantially increase equity investments in the sector and potentially lower cost and rents. The study identifies a number of specific obstacles to investment and makes suggestions for improving the investment climate.

*Prepared by Alex S. MacNiven. CMHC Project Officer: Ian Melzer. Ottawa: Canada Mortgage and Housing Corporation, 2001 (External Research Program) 183 pages.*

NOTE: No. 79 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

## ASSESSMENT REPORT ON RENTAL HOUSING TAXATION IN CANADA

The objective of this project is to write an assessment report on rental housing taxation in Canada which will identify all rental housing and related tax provisions; explain how each of these rental housing and related tax operates, including the use of illustrative numerical examples in each and every case; and discuss the generally-accepted criteria and a feasible methodology for determining the appropriateness of the current taxation regime applicable to rental housing.

**CMHC Project Officer :** Eric Tsang

**CIDN :** 2405 0100002

**Division :** Strategic Policy and Planning

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## INVESTMENT IN RESIDENTIAL RENTAL HOUSING IN CANADA: LESSONS LEARNED FROM STUDIES AND RESEARCH

The objective of this project was to identify the reasons that lead investors to include rental properties in their portfolios. The work consisted of a review of the literature addressing the choice of residential rental properties as investments and the place of such investments within investor portfolios. The consultant therefore had to present the different theories and approaches serving to determine the criteria used by investors.

This review first revealed the lack of reliable data on real estate return. Without such data, the empirical properties of this type of investment, and particularly its diversification effect, cannot be established accurately. The absence of any Canadian studies on this subject is also noted. In spite of these findings, certain studies tend to demonstrate that taxation related to rental housing investments has had a significant impact on the inclusion of such investments in investor portfolios. There is also the strong correlation between real estate return and inflation that may have encouraged investors to include such investments in their portfolios to protect their return against inflation.

*Prepared by Mario Fortin. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Benoît Sanscartier. Ottawa: CMHC, 2000, c1996.*

NOTE: Issued also in French under the title: Investissement dans le logement locatif résidentiel au Canada : leçons des études et avenues de recherche

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### NON-PAYMENT OF RENTS AND THE HEALTH OF THE RENTAL SECTOR IN QUEBEC

This research will measure the extent and spatial distribution of the non-payment of rents in Quebec and its economic impact on the rental sector; identify the socio-economic and demographic factors that could explain the growth of this phenomenon as observed in the number of actions brought by landlords; analyze the regulations governing the processing of recovery-termination cases in view of improving the current procedures at the Régie du logement.

**CMHC Project Officer :** Charles Fortin

**CIDN :** 2305 0200018

**Division :** External Research Program

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

### NON-REGULATORY INTERVENTIONS FOR ROOMING HOUSES/SROS AND TENANTS

This project will document non-regulatory initiatives that have been undertaken in Canada and the US that have had the effect of conserving the rooming house stock and stabilizing tenancies.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2432 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### REGULATORY FACTORS IN THE RETENTION AND EXPANSION OF ROOMING HOUSE STOCK: FINAL REPORT

This study was carried out to develop a comprehensive picture of how rooming houses are regulated across the country and, furthermore, how those regulations have affected the number and type of rooming houses over the years. A review of recent literature, together with profiles of rooming house regulatory practices in 11 major centres across Canada, found:

- that most municipalities follow similar regulatory approaches based on a combination of zoning regulations, maintenance and occupancy standards, building standards, fire-safety standards, public health standards and licensing laws;
- the lack of co-ordination in the application and enforcement of these regulations in many municipalities is creating concerns among operators and other stakeholders in the rooming house sector;
- there is a growing demand for rooming house-type accommodation due to such factors as growth in single person households, increasing homelessness and growing student needs;
- supply factors such as shrinking vacancy rates, escalating rents, long social housing waiting lists and lack of new social housing development are placing growing pressure on the rooming house sector.

The report identifies a number of lessons for effective enforcement and outlines innovative regulatory practices that have been adopted by municipalities such as the City of Edmonton and the City of Winnipeg to reduce regulatory barriers and costs.

*Prepared by The Starr Group Inc. in association with Richard Drdla Associates. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2000.*

**NOTE :** No. 48 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

## RENTAL HOUSING

### RENTERS AND THEIR HOUSING CONDITIONS: FROM THE 1980S INTO THE 1990S - A RETROSPECTIVE

Between the early 1980s and the mid-1990s, the situation facing renters in Canada changed. The demography of Canada's renter population changed, the economy went through boom, bust and much restructuring, and changes in spending by governments on social programs resulted in many renter households facing difficult choices. This report assembles comparable data on the change in condition of renter households between the early 1980s and mid-1990s. It is based largely on Household and Income, Facilities and Equipment (HIFE) micro-data samples from Statistics Canada.

*Prepared by John R. Miron. CMHC Project Officer: John Engeland. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2001. 38 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## RESIDENTIAL DEVELOPMENT

### COMMUNITY DESIGN: AN ANALYSIS OF DENSITY MEANINGS AND DEVELOPMENT OF A DESIGN TOOL

The study will address how Land Use Density (LUD) stipulations can impact and/or interplay with the various other system components of community plan-making, e.g. open space, schools, retail, etc.

**CMHC Project Officer :** Doug Pollard

**CIDN :** 1998 0200001

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### EFFECTS OF DEVELOPMENT CHARGES ON URBAN FORM

The purpose of this research project was to conduct a nation-wide survey of builders and developers to determine the effects of development charges on industry decisions related to residential densities, location and timing. Case studies in selected cities explore in more detail how specific development charge regimes are affecting residential development patterns.

This report looks at the effects of development charges (dc's) on industry decisions related to residential densities, location and timing. The first phase of the work consists of a survey of 1,214 builders and developers; 265 responses were submitted (22%), representing firms ranging in size from 5 to 60 employees. All of the firms are located in urban regions consisting of more than one municipality. Some of the results are presented below:

- Most of the respondents (86%) indicated that differences in development charge fees among the municipalities in their respective urban regions have at least some impact on their regional locational decisions; 32% indicated a major impact.
- Slightly more than 17% of respondents said that they always locate in municipalities with lower dc's, while 69% said that they sometimes favour areas with lower dc's.
- When locating within a municipality where dc's vary by location, 64% of respondents said that "area-specific" charges have a "major" or "medium" impact on their locational decisions; of these, 20.5% "always" located in lower-charge areas, while 63.6% "sometimes" located in lower-charge areas.



## RESIDENTIAL DEVELOPMENT

- A majority of respondents (54.5%) thought that development charges have a "major" or "medium" impact on their decisions related to lot sizes; of these, 56.5% thought that they tended to decrease lot sizes.
- 31.4% of respondents felt that the dc's in their respective municipalities favour detached houses; 24.4% said they favour attached houses; 18.6% said multiples; 14.0 thought they encourage a mix of houses; and the rest didn't know.

*Prepared by Ray Tomalty, Peck & Associates in association with Christine Warne and Pip White of Urban Aspects. Ottawa: Canada Mortgage and Housing Corporation, 2000.*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### PRO-HOME: A PROGRESSIVE, PLANNED APPROACH TO AFFORDABLE HOME OWNERSHIP

This study describes an incremental or progressive approach to residential development, the Pro-Home approach, and examines its potential to increase access to affordable home ownership in Canada.

Pro-Home refers to an incremental approach to housing development whereby households enter the market at a level they can afford, and over time, alter or expand their housing in accordance with their financial means and housing needs. Using lessons learned from the unplanned residential developments that took place in Toronto prior to 1950, the Pro-Home proposes a planned and progressive approach to housing development.

This study is organized in the following five parts:

- Part I outlines the context underpinning the Pro-Home concept, namely, the need to introduce new practical solutions to address the growing problem of housing affordability in major urban areas in Canada.
- Part II reviews a number of Canadian and international precedents of owner-built or incremental housing, tracing how progressive approaches to residential development have facilitated access to affordable home ownership and what lessons can be derived from these experiences.
- Part III provides a general description of the Pro-Home concept, illustrating its key features and design elements.
- Part IV presents a detailed application scenario of the Pro-Home approach to housing development, including a cost proforma and analysis of possible constraints to implementation.
- Part V proposes an implementation framework for incremental housing development, focusing on organizational elements such as partnerships, an organizational model and an implementation process.

*Prepared by John van Nostrand of Planning Alliance with the assistance of Jill Wigle. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program) vii, 65 pages.*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## RESIDENTIAL DEVELOPMENT

### PROJECT TO ENCOURAGE TRIPLEX AND QUADRUPLEX HOUSING, CITY OF NANAIMO, BRITISH COLUMBIA = PROJET VISANT À ENCOURAGER LES TRIPLEX ET QUADRUPLEX, VILLE DE NANAIMO (COLOMBIE-BRITANNIQUE)

This case study report describes the work of the City of Nanaimo to expand the opportunities for its growing numbers of lower to moderate income seniors, empty nesters and first time buyers to access affordable housing through the creation of well designed triplex and quadruplex projects. Community representatives, the Nanaimo Home Builders' Association and the Nanaimo Chapter of the Vancouver Island Architects Association participated in this project to provide an alternate form of housing that would fit in with traditional neighbourhoods. The objectives of the project were to:

- bring stakeholders in the housing sector together to design three innovative triplex and quadruplex housing forms;- prepare design guidelines for the development of attractive, affordable, triplex and quadruplex housing; and
- adopt appropriate changes to the Official Community Plan, Zoning Bylaw, Subdivision Guidelines and Multi-family Development Permit Guidelines to allow for this type of housing within single family neighbourhoods.

*Case study written by: Rowena E. Moyes. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1998. (Affordability and Choice Today (A.C.T.) Regulatory Reform Project; ACT Case Study) 48 pages*

Order Number: 61996

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

### RESIDENTIAL DEVELOPMENT IN COASTAL COMMUNITIES: ADDRESSING CLIMATE CHANGE THROUGH SUSTAINABLE COASTAL PLANNING

The objectives of this project are: to understand the relationship between coastal development, climate change and sea level rise; determine the policy and planning context, and stakeholder understanding of climate change and the impact of sea level rise on coastal residential development, in a local case study; and to recommend new development guidelines for coastal residential development to adapt to climate change and sea level rise.

**CMHC Project Officer :** Brian Eames

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2437 0200012

**STATUS :** Ongoing

**\* NEW \***

## SENIORS

### EVALUATION OF OPTIMAL BATH GRAB BAR PLACEMENT FOR SENIORS

This project's objective is to assess different locations and configurations of bathtub grab bars and to identify the safest and most useful options to help independent seniors living in the home to maintain their independence and avoid falls.

**CMHC Project Officer :** Luis Rodriguez

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2305 0200021

**STATUS :** Ongoing

## HOUSING OPTIONS FOR OLDER CANADIANS: USER SATISFACTION STUDY

The objective of this research was to carry out user satisfaction studies of some of the newer housing options that are currently available to older Canadians, and to produce an objective and detailed report based on the results of the research.

The research included 24 case studies of housing options for older Canadians from across the country. During site visits to each of these housing options, focus groups were held with key stakeholders involved in establishing and operating the projects (planners, managers, owners, service-providers, etc.), a sample of residents participated in "walk and talk" evaluations of their dwelling units, and study staff completed an architectural checklist. Additionally, photos, architectural drawings, brochures and policy manuals were collected from each of the 24 sites and a resident satisfaction survey was distributed.

The report is published in 3 parts:

Part 1 presents the findings from the 24 case studies that were carried out, emphasizing the projects' design characteristics and development process, as well as the residents' level of satisfaction with their housing. The results are grouped under six categories of housing.

Part 2 presents detailed findings from the Resident Satisfaction Survey that was carried out. These are discussed under the following nine headings: Respondent Characteristics, Personal Housing History, Current Housing, Satisfaction with Housing Features, Satisfaction with Tenure Arrangement, Satisfaction with Social Involvement and Interaction, Satisfaction with Management and Operational Approaches, Satisfaction with Support Services and Amenities and Overall Satisfaction with Housing Project.

Part 3 contains the frequency tables from which the data in Parts 1 and 2 reports derived, as well as the various forms, checklists, and research and survey tools that were used to carry out the study.

*Prepared by Gloria Gutman, Mary Ann Clarke Scott and Nancy Gnaedinger in collaboration with Danielle Maltais, Luba Serge and David Bruce. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Luis Rodriguez. Ottawa: CMHC, 2001. 3 volumes.*

NOTE: No. 83 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

## **IMPROVING QUALITY OF LIFE IN BOARDING HOUSES FOR THE ELDERLY: REGROUPEMENT DES RÉSIDENCES POUR RETRAITÉS DU QUÉBEC, MONTRÉAL, QUÉBEC = AMÉLIORATION DE LA QUALITÉ DE VIE DANS LES RÉSIDENCES POUR PERSONNES ÂGÉES : REGROUPEMENT DES RÉSIDENCES POUR RETRAITÉS DU QUÉBEC, MONTRÉAL, QUÉBEC**

In Quebec, as elsewhere in Canada, the growing number of seniors combined with a serious lack of housing has led to the proliferation of small, privately-run residences providing room and board to elderly persons. In many cases, these homes operate without a permit and therefore, without adequate regulatory control over the quality of the accommodation or services provided.

In response to this situation, in December 1993, the City of Châteauguay amended its bylaw to ensure that homes providing room and board to more than two persons meet minimum standards of health and safety. Inspired by the Châteauguay example, the Regroupement des résidences pour retraités du Québec (RRRQ), a provincial organization of seniors' residences, undertook an A\*C\*T initiative to develop a set of regulatory tools intended for use by Quebec municipalities wishing to improve the quality of life in small boarding houses for elderly people.



## SENIORS

This case study report describes the work done in reviewing existing regulatory initiatives in Châteauguay as well as in Laval and Longueuil, which led to the identification of three approaches to improving living conditions in small boarding houses:

- a model bylaw that applies to boarding houses containing fewer than ten rooms for rent;
- a municipal registry of homes that comply with the bylaw; and
- the creation of an ongoing dialogue between the key players, such as the municipality and a CLSC.

*Case study written by: Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999. (Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project; ACT Case Study)*

Order Number: 61998

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

## LIFE LEASE OWNERSHIP BY THE ELDERLY OF SUITES WITH CONTINUING CARE SERVICES

The objective of this research is to ascertain what form of regulation(s) would protect consumers while not overregulating the industry.

**CMHC Project Officer :** Luis Rodriguez

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2437 0200002

**STATUS :** Ongoing

**\* NEW \***

## SÉCURITÉ EN CAS D'INCENDIE : PERSONNES À MOBILITÉ RÉDUITE VIVANT EN MILIEU RÉSIDENTIEL RÉGULIER

The primary objective of the project was to identify measures that could increase the level of fire safety for persons with disabilities living in regular residential buildings.

The project concluded that owners of regular residential buildings must become aware of the situation of persons with disabilities who live in their buildings and that they must establish a fire safety plan (FSP) with evacuation strategies that take into account the architectural characteristics of the building, the characteristics and evacuation capacities of the occupants and the intervention capability of the local fire department. The report also provides advice to help owners establish a fire safety plan for their buildings.

*Prepared by Sophie Lanctôt, Société Logique inc. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program) 121 pages.*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## SENIORS

### SEMINARS ON SENIORS' HOUSING TO THE RESIDENTIAL CONSTRUCTION AND HEALTH CARE SECTORS

This project's objective is to develop and undertake delivery of seminars on seniors' housing to professionals in the Canadian residential and home care sectors. Included in this project will be development of presentation materials, trainer manuals, and communication support materials and organization and implementation of a "Train the Trainers" session and at least 10 seminars.

**CMHC Project Officer :** *Fran Harding*

**CIDN :** 2382 0200002

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

### STUDY OF SPATIAL ORIENTATION IN A RESIDENTIAL COMPLEX FOR SENIORS WITH OR WITHOUT COGNITIVE DISORDERS

The general purpose of this research project is to obtain spatial orientation design criteria that will make it possible to work on the architectural environment of residential complexes for seniors. The analysis concerns three typical residential complexes.

**CMHC Project Officer :** *Luis Rodriguez*

**CIDN :** 2144 0200017

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## SOCIAL HOUSING

### EVALUATION STUDY OF THE SHELTER ENHANCEMENT PROGRAM: SEP

The objective of this project is to complete an evaluation of the Shelter Enhancement Program.

**CMHC Project Officer :** *Patricia Streich*

**CIDN :** 2258 0500002

**Division :** Audit and Program Evaluation Services

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

### UNDERSTANDING THE ROLE OF MIXED INCOME HOUSING: AN EXAMINATION OF THE HOUSING SITUATION OF MARKET TENANTS LIVING IN SOCIAL HOUSING COMPARED TO MARKET TENANTS LIVING IN PRIVATE RENTAL HOUSING

This study looked at similarities and differences between market tenants living in social housing and market tenants living in private rental housing in Greater Vancouver in order to develop a better understanding of the benefit of having market units in social housing. The study also sought to better understand the housing challenges that families and individuals face in finding housing that meets their needs and that is affordable.

The study findings suggest that access to mixed income housing has helped to provide a certain degree of housing stability to family households with low to moderate incomes and has helped to respond to the specific housing needs of single parent families. With tight rental housing markets in many communities, the lack of new rental housing construction, and the increasing residualization of renter households, it is clear that this housing plays an important role in Canada's housing programs. It is also clear that many tenant households with low to moderate incomes would have fewer and less affordable housing options without this housing.

## SOCIAL HOUSING

Prepared by Jason and Lorraine Copas, Community Focus, Vancouver, B.C. CMHC Project Officer: William Lortie. Ottawa: Canada Mortgage and Housing Corporation, 2001. (External Research Program Report)

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

### ARDENCRAIG: DOCUMENTATION OF AN URBAN INFILL AND REMODEL PROJECT WITH SUSTAINABILITY FEATURES

Ardencraig is a heritage-style redevelopment project, that was completed in September 2000 by Chesterman Property Group Inc. in Vancouver. Chesterman converted an existing single family residence built in 1910 into four strata-titled townhouse units; three in the converted home and a new coach house in-fill residence on the rear yard. The property is located at 355 West 11th Avenue in the City Hall area of Vancouver.

The vision was to identify and prioritize a wide range of resource conservation, energy conservation and healthy building measures for inclusion in the project. These are design and construction methods that will minimize the impact of the project on the environment, and are generally referred to as "green building" or "sustainable building" approaches. The project is a market experiment and an example of producing high-quality housing through remodeling and infill (adding floor space to an existing property) in an environmentally sustainable way.

This report describes the story of Ardencraig from concept to completion, and details many of the specific decisions made about sustainability features. It also reports on a small market survey done during the marketing and post sales stages of the project.

Prepared by Urban Ecology Design Collaborative; Chesterman Property Group Inc.; and Wave Design + Media Inc. CMHC Project Officer: Brian Eames. Ottawa: Canada Mortgage and Housing Corporation, 2001. (External Research Program Report) 61 pages.

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### FROM THEORY TO PRACTICE: A REVIEW OF PERFORMANCE ASSESSMENT CRITERIA FOR IMPLEMENTING SUSTAINABLE COMMUNITIES

The purpose of this project is to identify and briefly describe a number of performance assessment criteria that are currently being used to operationalize the principles/features/objectives of sustainable community development from Canada, the US and Europe, etc.

**CMHC Project Officer :** Doug Pollard

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2305 0200012

**STATUS :** Ongoing



### HEADWATERS PROJECT: EAST CLAYTON NEIGHBOURHOOD CONCEPT PLAN. SOCIO-ECONOMIC RESEARCH HIGHLIGHT; NO. 78

The Headwaters project is a demonstration of sustainable development principles and performance standards in the community of East Clayton, Surrey, BC. Its purpose is to provide a replicable model that can be used to develop more sustainable communities throughout British Columbia's Lower Mainland Region and potentially beyond. This Research Highlight describes the Neighbourhood Concept Plan (NCP) and the planning process. It also examines some anticipated environmental and economic benefits of the NCP, including greenhouse gases from urban travel, impacts on local streams and hydrology, and infrastructure, land and building costs.

Ottawa: Canada Mortgage and Housing Corporation, 2001. 8 pages

Order number: 61170

NOTE: Aussi disponible en français sous le titre : Projet Headwaters - plan conceptuel du quartier d'East Clayton. Le Point en recherche; série socio-économique; no. 78

**STATUS :** New Completed Research Highlight

**AVAILABILITY :** Product is available on the web

### IMPACT OF HOUSING CHOICES: CONSUMER INFORMATION ON SUSTAINABLE COMMUNITY PLANNING

The purpose of this project is to develop a consumer-oriented information product comparing the impact of various housing choice scenarios, each with different community planning patterns.

**CMHC Project Officer :** Susan Fisher

**CIDN :** 2280 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### LANDSCAPE DESIGN AND MAINTENANCE FOR CANADIAN HOMES

The purpose is to develop an updated advisory document on landscape design, construction and maintenance for Canadian homes. CMHC's last advisory document of this nature, entitled Landscape Architectural Design and Maintenance, was published in 1982. While it offers many practical tips and tools which should be emulated, the update will be more oriented toward a consumer audience, place more emphasis on sustainability and build on recent CMHC research in this area. The document will be completed in 2001 and will be of interest to consumers, landscape architects and the landscape industry.

**CMHC Project Officer :** Susan Fisher

**CIDN :** 2229 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## MULTIPLE HOUSING FOR COMMUNITY SUSTAINABILITY

To design and build sustainable communities, professionals in the housing industry need to be familiar with the features of sustainability and their potential appeal to the consumer. This report focuses on the factors that make medium density housing sustainable and appealing to certain segments of the market. It provides a detailed account of consumer requirements for medium density housing and gives examples, both existing and new, of how these can be satisfied. It describes clearly which households are likely to choose medium density forms and how to appeal to them with specific features and marketing tactics. A wealth of illustrations make these features clear and connects them to expressed consumer expectations.

This study will become a valuable reference of ideas for developers or planners that seek to intensify land use in cities. The rich material in the report enables developers and municipalities to base the case for medium density housing firmly in consumer preferences and market demand. It gives the ground rules for satisfying consumer expectations and a range of models with which to do it. It promotes greater acceptance of medium density housing and that enable communities to become more sustainable.

*Prepared by Quadrangle Architects Limited, Urban Research Associates, Alen Kani Associates, David Redmond and Associates. Prepared for Research Division, Canada Mortgage and Housing Corporation and Natural Resources Canada, Regional Municipality of Ottawa-Carleton. CMHC Project Officer: Fanis Grammenos. Ottawa: CMHC, c2000. (Housing Affordability and Finance Series Research Report) iv, 53 pages*

Order number: 62148

NOTE : Aussi disponible en français sous le titre : Logement collectif et la collectivité durable

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

## PHASE III - DEVELOPMENT OF A SUSTAINABLE COMMUNITY DESIGN CHARRETTE FOR SOUTH EAST FALSE CREEK, VANCOUVER

This project's objective is to cosponsor a design charrette related to the area of Vancouver known as South East False Creek. The City of Vancouver will develop a generic sustainable community design charrette handbook to help guide further community planning and design efforts.

The handbook will provide a brief overview of sustainable community design charrettes, their purpose, goals and benefits and give guidance on how to decide whether a charrette is appropriate. Topics covered will include, organizational information, communications, logistics, material requirements, time and timing, products, choreography, facilitation, costs etc. The handbook will feature examples of past charrettes, primarily the South East False Creek charrette in Vancouver.

**CMHC Project Officer :** Doug Pollard

**Division :** Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2307 0200001

**STATUS :** Ongoing

**\* NEW \***

## SUSTAINABLE BUILT ENVIRONMENTS: A STUDY OF INDUSTRY VIEWS

The objectives of this project are:

- to identify the factors which influence developers to undertake developments with sustainable built environment characteristics. These factors may include the financial pro-forma, regulatory conditions, market demand, ease of financing and community/environmental vision.
- to determine the degree of interest in, knowledge of, and barriers to sustainable built developments that developers have.
- to identify the factors most likely to influence developers towards more sustainable development.
- to assess regional differences in developer attitudes towards projects containing features of sustainable built environments.

**CMHC Project Officer :** Doug Pollard

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2437 0200017

**STATUS :** Ongoing

**\* NEW \***

## SUSTAINABLE COMMUNITY PLANNING AND DEVELOPMENT: PARTICIPATION TOOLS & PRACTICES: FINAL REPORT

This manual is intended to help those who are seeking to involve others in sustainable community planning and development move through the various stages of participatory sustainable community planning smoothly and effectively. Principles, tools, methods and guidelines included in the manual are drawn from a wide range of expertise areas and input from experienced practitioners. Following a brief introduction providing reasons for the manual, a description of the intended audience, an overview of contents and guidance for use, the manual is presented in four main sections.

The first section, "Initiation", focuses on participation in the sustainable community planning context and includes special attention to key participation principles, levels of participation, and the issues and benefits of multi-stakeholder participation in sustainable community planning.

The second section, "Preparation", outlines in detail ten important steps for effective planning, implementation and follow-up. A series of tear-out tips and checklists for this section are provided in an appendix.

Section III, "Participation", presents essential tools and a 'toolkit' for participation in sustainable community planning. The toolkit includes short sheets outlining five general types of participation activity; a toolbox of more than 150 individual tools and methods useful for various activities; and a series of scenario maps which illustrate the ways various tools can be sequenced and how stakeholders can be involved throughout a particular planning process. Tool examples and resources for this section are included in the appendices.

The final wrap-up section of the manual, "Continuation", addresses ways for ensuring ongoing participation in planning, and speaks to the changing roles of planners and citizens in the process.

In sum, the aims of this book are:

- To provide users with a framework for developing an understanding of participation processes and issues; guidance for planning effective and continuous participatory sustainable community planning programs; and tools for undertaking such programs;
- To help shift community planning from one where planners say, "We'll figure it out and do it for you" to one where it is agreed that "We'll work and learn together" to find creative solutions and achieve mutually beneficial outcomes.



## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

Prepared by Fiona S. Crofton, Principal, ORCAD Consulting Group Inc. CMHC Project Officer: Doug Pollard,  
Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2001.

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### SUSTAINABLE INTEGRATION OF INFRASTRUCTURE AND BUILDINGS IN MAASTRICHT, THE NETHERLANDS

This project's objective is to conduct and report upon a workshop entitled 'Sustainable Integration of Infrastructure and Buildings in Maastricht, The Netherlands.

**CMHC Project Officer :** Doug Pollard

**CIDN :** 2310 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** There will be no product for this project \* **NEW** \*

### TESTING CONSUMER RECEPTIVITY TO SUSTAINABLE COMMUNITY DESIGN FOR A DEMONSTRATION BUILD SITE IN OKOTOKS, ALBERTA

CMHC contribution to develop a computer-based visualization tool that will illustrate and describe the features of a 144-acre demonstration project that adopts sustainable community principles and planning criteria.

**CMHC Project Officer :** Susan Fisher

**CIDN :** 2363 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### YOUR NEXT MOVE: CHOOSING A NEIGHBOURHOOD WITH SUSTAINABLE FEATURES

If you are considering a move, this guide will help you identify neighbourhood features that benefit you and the environment. You will learn about the features, like close access to shopping and jobs as well as see examples from real neighbourhoods across Canada. When searching for your next home, use the checklist to compare neighbourhoods.

*Ottawa: Canada Mortgage and Housing Corporation, 2001. 8 pages*

Order Number: 62180

Note: Aussi disponible en français sous le titre : Lors de votre prochain déménagement : choisissez un quartier comportant des caractéristiques durables

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products. Also available on the Internet:  
[http://www.cmhc-schl.gc.ca/en/bureho/buho/buho\\_003.cfm](http://www.cmhc-schl.gc.ca/en/bureho/buho/buho_003.cfm)

**\*\* SEE ALSO:** p. 67-70

### GREENHOUSE GAS EMISSIONS FROM URBAN TRAVEL: TOOL FOR EVALUATING NEIGHBOURHOOD SUSTAINABILITY

The purpose of this study is to develop a tool that calculates greenhouse gas (GHG) emissions from personal urban transportation (i.e. cars and public transit) given variations in neighbourhood planning and design variables such as density and land use mix, as well as demographic and locational variables. The Research Report includes a software tool that can be used to evaluate neighbourhood development proposals for GHG emissions from urban travel. In the study, the software is used to compare the GHGs from urban travel of nine neighbourhood scenarios, each with different design features and locational variables.

The results of the evaluation of the nine neighbourhood scenarios using the model developed in this study suggest that the "macro" urban structure is more important than the "micro" neighbourhood design in reducing GHG emissions from auto and transit travel by neighbourhood residents. That is, infill development is more effective than greenfield development in moderating the growth of GHG emissions, even if the new greenfield neighbourhood is neo-traditional rather than typical suburban in design. However, neighbourhood design is also a significant determinant of GHG emissions and can go a long way in improving the sustainability of neighbourhoods in the outer regions of urban areas.

The spreadsheet tool produced by this study provides a useful instrument for planners and developers in comparing the GHG emissions of different neighbourhood scenarios. It enables them to compare the implications of both local neighbourhood design and the broader-scale urban structure considerations of infill versus greenfield development.

*Prepared by IBI Group for Canada Mortgage and Housing Corporation and Natural Resources Canada. CMHC Project Officer: Susan Fisher. Ottawa: CMHC, 2000. (Healthy Housing and Communities Series) ix, 60 pages.*

Order Number: 62142

NOTE 1 : Aussi disponible en français sous le titre : Émissions de gaz à effet de serre attribuables aux déplacements urbains

NOTE 2 : No. 50 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS** : Completed Report and Research Highlight

**AVAILABILITY** : CMHC Information Products

### REGIONAL ROAD CORRIDOR DESIGN GUIDELINES. SOCIO-ECONOMIC RESEARCH HIGHLIGHT; NO. 52

This document addresses the function and design of regional arterial roads and adjacent lands in the urban areas and villages of the former Region of Ottawa-Carleton (now the City of Ottawa). It provides design guidelines that integrate traditional objectives like safety and efficiency of vehicular movement with safe, pleasant and convenient movement of pedestrians, cyclists, and transit users. The document crosses traditional boundaries between land use and transportation planning by including the road right-of-way (ROW) and its interface with adjacent land uses, right up to building facades. While the guidelines were developed specifically by the former Region of Ottawa-Carleton, they could also apply to similar municipalities across Canada.

*Ottawa: Canada Mortgage and Housing Corporation, 2001. 6 pages*

NOTE : Aussi disponible en français sous le titre : Lignes directrices en matière de conception des corridors de routes régionales. Point en recherche : série socio-économique; no. 52

**STATUS** : Completed Research Highlight

**AVAILABILITY** : Canadian Housing Information Centre and available on the Internet at: [http://www.cmhc-schl.gc.ca/publications/en/rh-pr/main\\_en.html](http://www.cmhc-schl.gc.ca/publications/en/rh-pr/main_en.html)

## WOMEN AND HOUSING

### HOUSING OPTIONS FOR RURAL WOMEN LIVING ALONE

This project's objectives are: to identify the unique housing requirements of women living alone in rural areas, the housing options that would meet these requirements, changes required to planning practices and land use regulations that would allow the housing sector to respond to the unique housing requirements of women living alone while respecting the density issues, environmental issues and other factors essential for the preservation of the rural character of life.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2437 0200004

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\* NEW \***

## YOUTH AND HOUSING

### INNOVATIVE HOUSING FOR HOMELESS YOUTH

The purpose of this project is to research and identify the innovative aspects of housing for homeless youth in terms of architecture, management and support services and to identify what makes a project exceptional and successful.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2305 0200001

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available





## BIBLIOGRAPHIES

- Adjustable Rate Mortgages / Prêts hypothécaires à taux flottant  
(Rev. 18p., October/octobre 1991)
- Building in cold climates / Construction dans les pays froids  
(Rev. 9p., December/décembre 1989)
- Children in the urban environment / Les enfants dans le milieu urbain  
(23 p., January/janvier 1993)
- CMHC Scholarship Program: A Bibliography 1947 - 1993 / Le Programme de bourses d'études de la SCHL : une bibliographie 1947 - 1993  
(66 p., 1994)
- Cohousing /Habitation communautaire  
(8p., July/juillet 1996)
- Congregate housing / Habitat collectif  
(10 p., November/novembre 1991)
- Construction industry in Canada / Industrie de la construction au Canada  
(Rev. 27 p., January/janvier 1988)
- Cooperative housing / Coopératives de logements  
(Rev. 40 p., September/septembre 1988)
- Crime prevention and architectural design / Design architectural et prévention de la criminalité  
(7 p., May/mai 1989)
- Crime prevention and urban safety in residential environments / La prévention du crime et la sécurité dans les milieux résidentiels urbains  
(12p., September/septembre 1989)
- Discrimination and segregation in housing in Canada / Bibliographie sur la discrimination et la ségrégation dans le logement au Canada  
(5p., March/mars 1993)
- Downtown redevelopment / Réaménagement de centres-villes  
(Rev. 26p., January/janvier 1989)
- Earthquakes and construction / Tremblements de terre et construction  
(20 p., March/mars 1995)
- \* External Research Program Reports arranged by subject / Rapports du programme de recherche à l'extérieur par sujet  
(Rev. 70 p., November/novembre 2001)
- Floating Homes and Houseboats / Maisons-bateaux et Bateaux-maisons  
(15 p., August/août 1997)
- Foundations / Fondations  
(17p., January/janvier 1989)
- Graduated payment mortgages / Prêts hypothécaires à paiements progressifs  
(Rev.3p., October/octobre 1991)
- Home equity conversion / Conversion de la valeur nette du logement  
(9p., October/octobre 1988)
- Home ownership / La propriété d'un logement  
(Rev. 28p., August/août 1987)
- Homelessness / Sans-logis  
(Rev. 61p., June/juin 1998)

- Housing and AIDS / Hébergement des personnes atteintes du SIDA  
(5 p., September/septembre 1993)
- Housing and services for the disabled / Logement et les services pour les handicapés  
(Rev. 68 p., April/avril 1992)
- Housing conversion and residential intensification / Conversion d'habitations et intensification résidentielle  
(Rev. 8 p., October/octobre 1990)
- Housing demand / La demande en logement  
(22 p., November/novembre 1986)
- Housing for immigrants and minorities / Logement pour les groupes ethniques et immigrants  
(7 p., May/mai 1993)
- Housing for single people / Le logement et les personnes seules  
(7 p., October/octobre 1992)
- Housing in Canadian municipalities / Logement dans les municipalités canadiennes  
(Rev. 44 p., March/mars 1985)
- Housing in urban core areas / Logement dans les centres-villes  
(Rev. 13 p., January/janvier 1985)
- Housing management / Gestion des logements  
(Rev. 23 p., January/janvier 1989)
- Housing markets / Le marché du logement  
(Rev. 36 p., January/janvier 1988)
- Housing policy in Canada / Politique du logement au Canada  
(Rev. 45 p., January/janvier 1987)
- Housing quality / Qualité de logement  
(8 p., January/janvier 1988)
- Housing renovation / Restauration de quartiers résidentiels  
(Rev. 62 p., March/mars 1988)
- Housing subsidies / Subventions au logement  
(Rev. 49 p., October/octobre 1990)
- Impact of inflation on house prices / Effets de l'inflation sur le prix des maisons  
(Rev. 5 p., February/février 1995)
- Indoor air pollution / Pollution de l'air des habitations  
(Rev. 29 p., July/juillet 1990)
- Infill housing / Logement résidentiel complémentaire  
(Rev. 8 p., March/mars 1990)
- Insulation / Isolement  
(Rev. 33 p., November/novembre 1991)
- Land banks and land trusts / Banques agraires et sociétés foncières  
(15 p., November/novembre 1990)
- Life cycle costing / Estimations du coût global  
(Rev. 9 p., November/novembre 1992)
- Lofts / Lofts  
(6 p., July/juillet 1996)



- Log structures / Constructions en pièce sur pièce  
(Rev. 8 p., April/avril 1989)
- Low cost affordable housing / Habitation à coût modique  
(Rev. 35 p., October/octobre 1989)
- Manufactured housing / Habitation préfabriquée  
(Rev. 33 p., November/novembre 1986)
- Moisture problems in buildings / Humidité dans les constructions  
(Rev. 21 p., July/juillet 1990)
- Mortgage-backed securities / Titres hypothécaires  
(13 p., March/mars 1988)
- Mortgage insurance / L'assurance hypothécaire  
(11 p., April/avril 1988)
- Mortgages / Hypothèques  
(Rev. 21 p., August/août 1984)
- Native housing / Logement pour autochtones  
(42 p., January/janvier 1996)
- Noise / Le bruit  
(30 p., December/décembre 1991)
- Non-profit housing / Le logement à but non-lucratif  
(Rev. 19 p., October/octobre 1989)
- Playgrounds / Terrains de jeux  
(Rev. 30 p., December/décembre 1991)
- Post occupancy evaluation / Évaluation après occupation  
(13 p., February/février 1989)
- Public housing in Canada / Habitations à loyer modéré au Canada  
(Rev. 63p., September/septembre 1991)
- Public housing in Great Britain / Habitations à loyer modéré au Grande-Bretagne  
(17p., September/septembre 1988)
- Public/Private Partnerships / Association du secteur public et du secteur privé  
(13 p., December/décembre 1989)
- Radon and houses / Radon dans les habitations  
(Rev. 23 p., July/juillet 1990)
- Real estate in Canada / Propriété immobilière au Canada  
(Rev. 37 p., September/septembre 1987)
- Rent control / Contrôle des loyers  
(Rev. 20 p., August/août 1990)
- \* Rental housing / Logement locatif  
(111 p., September/septembre 2000)
- Residential development / Développement résidentiel  
(Rev. 57 p., July/juillet 1991)
- Residential displacement, relocation, and gentrification / Relogement, relocalisation, et embourgeoisement  
(19 p., September/septembre 1988)

- Residential Rehabilitation Assistance Program / Programme d'aide à la remise en état des logements  
(8 p., February/février 1988)
- Resource communities / Villes d'exploitation de ressources  
(Rev. 15 p., March/mars 1988)
- Retirement and life care communities / Collectivités de retraités et communautés fournissant des soins à vie  
(Rev. 10 p., March/mars 1990)
- Rural housing / Logement rural  
(Rev. 18 p., March/mars 1988)
- Secondary mortgage markets / Marchés hypothécaires secondaires  
(6 p., August/août 1982)
- Self-help housing / Autoconstruction  
(Rev. 13 p., January/janvier 1989)
- Seniors housing / Le logement et les personnes âgées  
(Rev. 146 p., October/octobre 2000)
- Shared housing / Logement à contrepartie de travaux  
(Rev. 11 p., October/octobre 1994)
- Solar access rights / Droit au soleil  
(Rev. 8 p., October/octobre 1992)
- Solar heating / Chauffage solaire  
(Rev. 16 p., October/octobre 1992)
- Solar houses / Maisons solaires  
(Rev. 22 p., October/octobre 1992)
- Stackwall and cordwood house construction / Construction de maisons de «bois cordé»  
(Rev. 2 p., December/décembre 1992)
- \* Straw bale housing / Maisons de ballots de paille et mortier  
(Rev. 14 p., December/décembre 2001)
- Student housing / Logement pour les étudiants  
(Rev. 6 p., July/juillet 1989)
- Temporary shelter for battered women / L'hébergement temporaire pour les femmes victimes de violence  
(Rev. 11 p., May/mai 1991)
- Total Quality Management/Qualité totale  
(17p., July/juillet 1996)
- Underground housing / Maisons souterraines  
(Rev. 31 p., October/octobre 1992)
- Urban Infrastructure in Canada / L'infrastructure urbaine au Canada  
(62 p., April/avril 1989)
- Vacation homes / Chalets  
(29 p., November/novembre 1991)
- Variable-rate mortgages / Les prêts hypothécaires à taux variable  
(Rev. 9p., October/octobre 1991)

## BIBLIOGRAPHIES

Ventilation / Ventilation

(Rev. 26 p., September/septembre 1991)

Wind pressure and buildings / Les pressions exercées par le vent sur les bâtiments

(Rev. 13 p., November/novembre 1990)

Women and housing / Les femmes et le logement

(15 p., April/avril 1991)

Wood construction / Construction en bois

(Rev. 21 p., August/août 1987)

Youth and Housing / Les jeunes et le logement

(20 p., November/novembre 1998)



## TITLE INDEX

- ABORIGINAL HOUSING: LOCAL DESIGN AND MATERIAL, 13
- ABOUT YOUR HOUSE - HIRING A HOME INSPECTOR, 62
- ACT REGIONAL STAKEHOLDER INFORMATION SESSIONS, 94
- ACTION PLAN FOR REVITALIZING A COMMERCIAL ARTERY: COLLECTIF EN AMÉNAGEMENT URBAIN HOCHELAGA-MAISONNEUVE, MONTRÉAL, QUÉBEC = PLAN D'ACTION POUR LA RVITALISATION D'UNE ARTÈRE COMMERCIALE : COLLECTIF EN AMÉNAGEMENT URBAIN HOCHELAGA-MAISONNEUVE, MONTRÉAL, QUÉBEC, 109
- ADAPTATION OF POTENTIAL HOUSING DEMAND MODEL TO ABORIGINAL COMMUNITIES - AN EXAMPLE, 77
- AFFORDABLE HOUSING ADVISOR, 95
- AIR LEAKAGE CHARACTERISTICS, TEST METHODS AND SPECIFICATIONS FOR LARGE BUILDINGS, 21
- ALTERNATE ABORIGINAL TRAINING DELIVERY OPTIONS, 77
- ALTERNATIVE HOME ENERGY SOURCES FOR THE NORTH, 22
- ALTERNATIVE WALL SYSTEMS FOR LOW-RISE RESIDENTIAL CONSTRUCTION, 44
- ANALYSIS OF PENSION AND RRSP INVESTMENTS IN CANADIAN RENTAL HOUSING, 114
- ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS, 22
- APPLICABILITY OF A CONTINUUM OF CARE MODEL TO ADDRESS HOMELESSNESS, 87
- ARDENCRAIG: DOCUMENTATION OF AN URBAN INFILL AND REMODEL PROJECT WITH SUSTAINABILITY FEATURES, 123
- ASSESSING THE FULL COSTS OF WATER, LIQUID WASTE, ENERGY AND SOLID WASTE INFRASTRUCTURE IN THE FRASER VALLEY REGIONAL DISTRICT, 82
- ASSESSING THE PARAMETERS FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS, 27
- ASSESSMENT AND ALTERNATIVE APPROACHES FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS, 27
- ASSESSMENT OF PREFABRICATED BUILDING SYSTEMS INDUSTRY, 98
- ASSESSMENT REPORT ON RENTAL HOUSING TAXATION IN CANADA, 115
- ASSESSMENTS OF EFFECTS OF GRAIN ELEVATOR CLOSURES IN SASKATCHEWAN, 104
- AUSTRALIAN BUILDING REGULATION AND LIABILITY REFORMS: AN UPDATE, 109
- BEST PRACTICE GUIDE - FIRE AND SOUND ASSEMBLIES FOR MULTI-FAMILY BUILDINGS, 30
- BEST PRACTICE GUIDE - WOOD FRAME ENVELOPES IN COASTAL CLIMATES OF BRITISH COLUMBIA, 31
- BEST PRACTICE GUIDE FOR CURTAIN WALLS, 31
- BEST PRACTICE GUIDE FOR EXTERIOR INSULATED FINISHED SYSTEMS (EIFS), 31
- BEST PRACTICE GUIDE FOR PRE-CAST CONCRETE WALLS, 20

BETH PROJECT: A BUILDING ENVELOPE TEST HUT IN COASTAL BRITISH COLUMBIA: FEASIBILITY STUDY, 32

BETTER BUILDING GUIDE TO INNOVATION IN THE DESIGN AND CONSTRUCTION OF HIGH-RISE RESIDENTIAL BUILDINGS, 32

BETTER BUILDINGS CASE STUDY - CONDENSATION CONTROL IN THE EXTERIOR WALLS OF THE CCOC APARTMENT BUILDING AT 520 BRONSON STREET; A DBZ REMEDIAL REPAIR PROJECT, 54

BREEAM GREEN LEAF ECO-RATING PROGRAM: CMHC MULTI-RESIDENTIAL BUILDINGS ASSESSMENT PILOT: FINAL REPORT, 32

BRINGING COMPUTERS INTO THE PERMITTING PROCESS, STRATHCONA COUNTY, ALBERTA = AUTOMATISATION DU PROCESSUS D'ÉMISSION DE PERMIS, STRATHCONA COUNTY (ALBERTA), 110

BRITISH COLUMBIA HIGH-RISE ENVELOPE DETAILS STUDY, 33

BUILDING COMMUNITIES: FIRST NATIONS BEST PRACTICES FOR HEALTHY HOUSING AND SUSTAINABLE COMMUNITY DEVELOPMENT, 13

BUILDING ENVELOPE REHABILITATION: CONSULTANT'S GUIDE , 33

BUILDING ENVELOPE REHABILITATION: OWNER-PROPERTY MANAGER GUIDE, 33

BUILDING ENVELOPE SOLUTIONS - THEORY AND PRACTICE, 44

BUILDING FAILURES UPDATE 2000 - HIGH-RISE CONDOMINIUMS STUDIES, 34

CANADA POLAND RESIDENTIAL REAL ESTATE INVESTMENT MODEL: AN EVALUATION OF POLAND'S RESIDENTIAL REAL ESTATE MARKET: SUMMARY, 99

CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS NATIONAL INITIATIVE, 63

CANADIAN HOMES AND CLIMATE CHANGE, 67

CANADIAN HOUSING AND RENEWAL ASSOCIATION RESEARCH PROJECT ON BOARD RENEWAL, 85

CASE STUDIES OF MAJOR HOME ENERGY RETROFITS, 22

CASE STUDIES OF WATER CONSERVATION INITIATIVES IN MULTIS, 70

CASE STUDY OF A SUCCESSFUL INNOVATIVE MULTI-UNIT RESIDENTIAL BUILDING: A COMPENDIUM OF RESEARCH OF THE CONSERVATION CO-OP BUILDING, 34

CD-ROM VERSION OF THE CANADIAN WOOD-FRAME HOUSE CONSTRUCTION, 45

CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS, 27

CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA, 35

CHILDREN AND YOUTH IN HOMELESS FAMILIES: SHELTER SPACES AND SERVICES, 88

CLEANING UP YOUR HOUSE AFTER A FIRE, 26

CLEANING UP YOUR HOUSE AFTER A FLOOD AND CLEAN-UP PROCEDURES FOR MOLD IN HOUSES, 54

CMHC GARBAGE BAG AIRFLOW TEST. ABOUT YOUR HOUSE; CE33, 28

CMHC SPONSORED FEASIBILITY STUDY ON USING THE PRIVATE HOME INSPECTION INDUSTRY TO COLLECT DATA ON THE PHYSICAL CONDITION OF CANADA'S EXISTING HOUSING STOCK, 63

COCHRANE, ALBERTA, COMMUNITY-BASED AFFORDABLE HOUSING INITIATIVE, PLANNING AND ENGINEERING SERVICES DEPARTMENT, TOWN OF COCHRANE, ALBERTA, 95

COMMUNICATIONS & INFORMATION TRANSFER STRATEGY FOR ABORIGINAL GROUPS, 77

COMMUNITY DESIGN: AN ANALYSIS OF DENSITY MEANINGS AND DEVELOPMENT OF A DESIGN TOOL, 117

COMPARING THE PERFORMANCE OF TWO-COAT VS THREE-COAT STUCCO, 46

COMPARISON OF NORTHERN HOUSING COSTS, 57

COMPREHENSIVE STUDY ON SLAB-ON-GRADE FOUNDATIONS, 15

CONCEPT OF A QUALITY LOCATION AND THE CENTRAL DISTRICTS OF MONTRÉAL, 83

CONDITION SURVEY OF CONDOMINIUMS IN THE GREATER TORONTO AREA (GTA), 35

CONDOMINIUM OWNERS' GUIDE TO MOLD. ABOUT YOUR HOUSE; CE36, 54

CONSTRUCTION RESOURCE MANAGEMENT COURSE - PHASE II, 67

CONTINUATION OF NORTHERN VENTILATION STUDY, 57

CONTRIBUTION TO A STUDY ON PACIFIC RIM MARKETS FOR TERMITE-RESISTANT WOOD PRODUCTS, 99

CONVERSION OF HIGH-RISE BUILDINGS TO RESIDENTIAL USE, 36

CONVERSION OF NON-RESIDENTIAL BUILDINGS TO MULTI-RESIDENTIAL USE, 36

COST-EFFECTIVE INDOOR AIR QUALITY AND ENERGY EFFICIENCY RECOMMENDATIONS FOR FIRST NATIONS HOUSING, 14

COST OF CO-OPERATIVE HOUSING, 85

CRISIS SITUATIONS IN COOPERATIVES: INCREASING UNDERSTANDING TO IMPROVE INTERVENTION, 85

DAWSON CITY DEMONSTRATION PROJECT - MONITORING, 28

DEFINING PERFORMANCE OF WATER RESISTIVE BARRIERS, 55

DEFINING THE CONVECTIVE DRIVING FORCE FOR SOIL GAS INTRUSION INTO HOUSES: FINAL REPORT, 49

DEMOGRAPHIC CHANGES AND REAL HOUSING PRICES IN CANADA, 103

DEMONSTRATION OF HEALTHY HOUSING ON RESERVE, 14

DEMONSTRATION OF SAFE HOUSING ON LIGHTLY CONTAMINATED LANDS, 20

DEPRESSURIZATION TESTING OF SPILLAGE-RESISTANT APPLIANCES, 50

DESIGN MULTIPLE-UNIT CHUM'S AND MODULAR HOUSE PACKAGES FOR URBAN AND SUBURBAN, REMOTE AND NORTHERN COMMUNITIES, 49

DETERMINING THE EFFORT NEEDED BY ADULTS AND SENIORS TO CLIMB RAMPS USING MANUAL WHEELCHAIRS, 106

DEVELOP A SET OF ENVIRONMENTALLY SUSTAINABLE SITE AND BUILDING DESIGN, CONSTRUCTION AND OPERATION GUIDELINES FOR SINGLE AND MULTI-FAMILY UNIT HOUSING, MOTELS AND HOTELS FOR THE TOWN OF BANFF, 67

DEVELOPMENT OF A CEMENT STRESS-SKIN EPS-CORE BUILDING SYSTEM, 36

DEVELOPMENT OF A GUIDE TO THE UNITED KINGDOM BUILDING REGULATIONS, 99



DEVELOPMENT OF A PROCEDURE FOR ESTIMATING AIR CHANGE RATES USING A SPECIFIC ODOUR AS A TRACER GAS, 50

DEVELOPMENT OF A RESEARCH FRAMEWORK FOR POPULATION HEALTH AND HOUSING, 108

DEVELOPMENT OF A SURVEY INSTRUMENT TO STUDY LINKS BETWEEN LIVING ARRANGEMENTS, HOMELESSNESS AND RESIDENTIAL MOBILITY OF URBAN ABORIGINALS: FINAL REPORT, 78

DEVELOPMENT OF AN EXPORT TOOL-KIT FOR CHINA, 99

DEVELOPMENT OF AN INSTRUCTOR'S GUIDE AND AN ACCOMPANYING PRESENTATION FOR RESIDENTIAL GUIDE TO EARTHQUAKE RESISTANCE, 46

DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR), 36

DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR) TASK 2: COLLECTION OF ADDITIONAL BUILDING FILES FOR THE HISTAR DATABASE, 37

DISINVESTMENT AND THE DECLINE OF URBAN NEIGHBORHOODS, 114

DOMESTIC COLD WATER BOOSTER PUMP CONTROL MONITORING PILOT PROGRAM = LE PROGRAMME PILOTE DE CONTRÔLE POUR POMPE RELAIS À EAU FROIDE DOMESTIQUE, 70

DUAL FLUSH TOILET PILOT PROJECT, 71

ECONOMIC FEASIBILITY STUDY OF WATER REUSE AND TREATMENT TECHNOLOGIES, 71

ECOPERTH: A SMALL RURAL COMMUNITY TAKES ACTION ON CLIMATE CHANGE, 68

EFFECTS OF DEVELOPMENT CHARGES ON URBAN FORM, 117

EFFECTS OF URBAN ABORIGINAL RESIDENTIAL MOBILITY AND SERVICE PROVISION, 79

ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS, 23

ENERGY EFFICIENCY OPPORTUNITIES MANUAL FOR MULTI-UNIT RESIDENTIAL BUILDINGS, 23

ENERGY USE PATTERNS IN OFF-GRID HOUSES, 24

ENVELOPE DRYING RATES EXPERIMENT: FINAL REPORT, 37

ENVIRONMENTAL SCAN ON YOUTH HOMELESSNESS, 89

ESTIMATION OF CORE HOUSING NEED USING THE SURVEY OF HOUSEHOLD SPENDING MICROFILE, 104

ETHNIC CHANGES AND THE HOUSING MARKET IN RIVIÈRE-DES-PRAIRIES, MONTRÉAL, 104

EVALUATION OF OPTIMAL BATH GRAB BAR PLACEMENT FOR SENIORS, 119

EVALUATION OF THE MEASUREMENT OF HOUSING NEED IN NORTHERN AND REMOTE COMMUNITIES, 106

EVALUATION STUDY OF THE SHELTER ENHANCEMENT PROGRAM: SEP, 122

EVOLVING IMPACT OF E-COMMERCE ON HOUSING FINANCE ACCESS AND AFFORDABILITY: US EXPERIENCE AND LESSONS FOR CANADA, 105

EXAMINATION OF THE HOUSING CHOICES OF PERSONS WITH DISABILITIES, 106

EXAMINING INUIT SPACE USE IN EURO-CANADIAN HOUSE FORMS, 79

FACILITATING THE PENETRATION OF CANADIAN COMPANIES INTO THE CHILEAN HOUSING SECTOR: EXECUTIVE SUMMARY, 100

FEASIBILITY OF DEVELOPING A BUILDING CANADA PROGRAM, 46

FEASIBILITY STUDY: DEVELOPING A GUIDE FOR ENGINEERED WOOD I-JOIST FLOOR SYSTEMS, 47

FEASIBILITY STUDY FOR A HERITAGE RENOVATION ASSISTANCE SERVICE, LAC-SAINT-JEAN HISTORICAL SOCIETY, ALMA, QUEBEC = ÉTUDE DE FAISABILITÉ SUR UN SERVICE D'AIDE À LA RÉNOVATION PATRIMONIALE, SOCIÉTÉ D'HISTOIRE DU LAC-SAINT-JEAN, ALMA (QUÉBEC), 64

FEASIBILITY STUDY ON THE DEVELOPMENT OF A COMMISSIONING GUIDE FOR NEW HOUSES, 47

FIELD TESTING OF A POSITIVE PRESSURE VENTILATION DEVICE, 28

FIELD TESTS OF VENTILATION SYSTEMS INSTALLED TO MEET THE 1993 OBC AND 1995 NBC, 29

FINANCIAL TOOLS FOR CO<sub>2</sub> REDUCTION, 24

FIRE AND ACOUSTICAL PERFORMANCE OF FLOOR ASSEMBLIES - PHASE II, 38

FIRST NATIONS HOUSING PROPERTY MANAGEMENT TRAINING COURSES AND RESOURCES, 79

FROM THEORY TO PRACTICE: A REVIEW OF PERFORMANCE ASSESSMENT CRITERIA FOR IMPLEMENTING SUSTAINABLE COMMUNITIES, 123

GOVERNANCE IN LOCAL PARTNERSHIPS TO ADDRESS HOMELESSNESS, 89

GREENHOUSE GAS EMISSIONS FROM URBAN TRAVEL: TOOL FOR EVALUATING NEIGHBOURHOOD SUSTAINABILITY, 128

GUIDE FOR THE HEALTHY RENOVATION OF A ONE STOREY HOUSE CIRCA. 1960-1979, 64

GUIDE TO DEVELOPING A MUNICIPAL AFFORDABLE HOUSING STRATEGY, 96

GUIDELINES FOR MOISTURE MANAGEMENT IN EXTERIOR WALL SYSTEMS, 55

GUIDELINES FOR THE MEASUREMENT OF MOISTURE CONTENT IN FRAMED LUMBER, 55

GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS, 38

HEADWATERS PROJECT -EAST CLAYTON NEIGHBOURHOOD CONCEPT PLAN. SOCIO-ECONOMIC RESEARCH HIGHLIGHT; NO. 78, 124

HEALTHY INDOOR ENVIRONMENTS PHASE 2: CONSULTATION PROCESS, 50

HIRING A CONTRACTOR. ABOUT YOUR HOUSE; CE26A, 64

HOME IS WHERE THEIR WHEELS ARE: THE HOMEMAKING AND HOUSING EXPERIENCES OF MOTHERS WHO USE WHEELCHAIRS FOR FULL-TIME MOBILITY, 107

HOMELESS INDIVIDUALS AND FAMILIES INFORMATION SYSTEM (HIFIS), 90

HOMEOWNERSHIP EDUCATION AND COUNSELLING: AN EXAMINATION OF U.S. EXPERIENCE AND ITS RELEVANCE FOR CANADA, 86

HOUSING AND BUILDING MARKET IN CHILE, CHINA, GERMANY, JAPAN, KOREA, POLAND, UNITED KINGDOM, 100

HOUSING CANADA'S CHILDREN, 81

HOUSING CHOICE AND ADAPTABILITY FOR AFRICAN REFUGEES: THE CANADIAN AFRICAN NEWCOMER AID CENTRE, TORONTO (ONTARIO) = CHOIX ET ADAPTABILITÉ DES LOGEMENTS DESTINÉS AUX RÉFUGIÉS AFRICAINS : THE CANADIAN AFRICAN NEWCOMER AID CENTRE, TORONTO (ONTARIO), 97

HOUSING CONDITIONS OF PERSONS WITH HEALTH AND ACTIVITY LIMITATIONS IN CANADA, 1991: A RETROSPECTIVE, 107

HOUSING CONSTRUCTION INDUSTRY: CHALLENGES AND OPPORTUNITIES FOR THE 21ST CENTURY, 91

HOUSING FORM AND QUALITY IN RELATION TO CHILDREN'S MENTAL HEALTH, 82

HOUSING IN CANADA (HIC) CD-ROM DATA BASE, 92

HOUSING MARKET GUIDES ON FOUR CITIES IN THE UNITED STATES, 101

HOUSING NEEDS OF LOW-INCOME PEOPLE LIVING IN RURAL AREAS, 90

HOUSING OPTIONS FOR OLDER CANADIANS: USER SATISFACTION STUDY, 120

HOUSING OPTIONS FOR RURAL WOMEN LIVING ALONE, 129

HOUSING STABILITY AND MENTAL ILLNESS, 90

HOW CAPE BRETON REGIONAL MUNICIPALITY STREAMLINED RESIDENTIAL BUILDING PLANS APPROVALS BY IMPROVING THE QUALITY OF PLANS SUBMITTED FOR REVIEW: FIRE-RESCUE AND BUILDING SERVICES DEPARTMENT OF THE CAPE BRETON REGIONAL MUNICIPALITY, NOVA SCOTIA = COMMENT LA MUNICIPALITÉ RÉGIONALE DU CAP-BRETON A RATIONALISÉ L'APPROBATION DES PLANS DE CONSTRUCTION RÉSIDENIELLE EN AMÉLIORANT LA QUALITÉ DES PLANS PRÉSENTÉS POUR FINS D'EXAMEN : SERVICES DES INCENDIES ET DU BÂTIMENT DE LA MUNICIPALITÉ RÉGIONALE DU CAP-BRETON, NOUVELLE-ÉCOSSE, 110

HOW THE DISTRICT OF NORTH VANCOUVER BUILT COMMUNITY ACCEPTANCE FOR THE LEGALIZATION OF SECONDARY SUITES IN SINGLE FAMILY NEIGHBOURHOODS = COMMENT LE DISTRICT DE NORTH VANCOUVER EN EST VENU À FAIRE ACCEPTER PAR LA COLLECTIVITÉ LA LÉGISLATION DES APPARTEMENTS ACCESSOIRES DANS LES QUARTIERS CONSTITUÉS DE MAISONS INDIVIDUELLES, 111

IDENTIFICATION OF GAPS IN DISASTER INFORMATION RELATED TO HOUSING, 93

IDENTIFY EXISTING AND EMERGING GREYWATER TREATMENT AND RE-USE TECHNOLOGIES AND TO EXPAND AND REVISE ITS TECHSPEX SOFTWARE TO INCLUDE GREYWATER OPTIONS, 71

IMPACT OF CONVERSIONS OF RENTAL TO OWNERSHIP UNITS ON HOUSING MARKETS IN ONTARIO, 104

IMPACT OF HOUSING CHOICES: CONSUMER INFORMATION ON SUSTAINABLE COMMUNITY PLANNING, 124

IMPACT OF THE HOME BUYERS' PLAN ON THE DECISION TO BUY A HOME, 86

IMPLEMENTING SUSTAINABLE COMMUNITY DEVELOPMENT: CHARTING A FEDERAL ROLE FOR THE 21ST CENTURY, 68

IMPLEMENTING THE OUTCOMES OF THE SECOND UNITED NATIONS CONFERENCE ON HUMAN SETTLEMENTS (HABITAT II): CANADA'S RESPONSE = MISE EN OEUVRE DES MESURES ADOPTÉES LORS DE LA DEUXIÈME CONFÉRENCE DES NATIONS UNIES SUR LES ÉTABLISSEMENTS HUMAINS (HABITAT II) : RAPPORT DU CANADA, 83

IMPROVEMENTS TO THE MOISTURE PERFORMANCE OF PRESERVED WOOD FOUNDATIONS, 56

IMPROVING QUALITY OF LIFE IN BOARDING HOUSES FOR THE ELDERLY: REGROUPEMENT DES RÉSIDENCES POUR RETRAITÉS DU QUÉBEC, MONTRÉAL, QUÉBEC = AMÉLIORATION DE LA QUALITÉ DE VIE DANS LES RÉSIDENCES POUR PERSONNES ÂGÉES : REGROUPEMENT DES RÉSIDENCES POUR RETRAITÉS DU QUÉBEC, MONTRÉAL, QUÉBEC, 120

INCREASING HOUSING IN RURAL COMMUNITY CENTRES, BEAUBASSIN PLANNING COMMISSION, CAP-PELÉ, NEW BRUNSWICK = LA DENSIFICATION RÉSIDENIELLE DANS LES CENTRES COMMUNAUTAIRES RURAUX, COMMISSION D'AMÉNAGEMENT BEAUBASSIN, CAP-PELÉ (NOUVEAU-BRUNSWICK), 112



INDOOR AIR POLLUTION FROM ATTACHED GARAGES, 51

INDUSTRY PROFILE OF CANADIAN LIGHT STEEL BUILDING, 92

INNOVATIVE FOUNDATIONS, HEATING & VENTILATION, 58

INNOVATIVE HOUSING FOR HOMELESS YOUTH, 129

IN-SITU MONITORING OF EXTERIOR WALL ASSEMBLIES - MONTREUX RESIDENCES, 38

IN-SITU PERFORMANCE OF THE EXTERIOR WALL SYSTEM, 38

INSULATED CONCRETE FORMS TRAINING PROGRAM, 16

INTERCULTURAL COMMUNICATION OF CMHC INFORMATION PRODUCTS TO THE ABORIGINAL POPULATION, 80

INTERGENERATIONAL HOUSING TRENDS AND CHALLENGES, 93

INVESTIGATION OF CO-VENTURES AND EXPORT POTENTIAL FOR BUILDING PRODUCTS AND MATERIALS RELATED TO SUSTAINABLE DEVELOPMENT IN CHINA, 101

INVESTIGATION OF SMOKE CONTROL IN HIGH-RISES BY POSITIVE PRESSURE VENTILATION, 26

INVESTMENT IN RESIDENTIAL RENTAL HOUSING IN CANADA: LESSONS LEARNED FROM STUDIES AND RESEARCH, 115

INVOLVING CLIENTS IN ADDRESSING HOMELESSNESS, 91

ISSUES PAPER ON LIABILITY IN HOUSE CONSTRUCTION, 84

LAND USE ISSUES IMPEDING AFFORDABLE HOUSING WITH MOBILE HOMES, 53

LANDSCAPE DESIGN AND MAINTENANCE FOR CANADIAN HOMES, 124

LEAK-PROOFING WINDOWS, PHASE I - FABRICATION, INSTALLATION AND MAINTENANCE, 21

LEAK-PROOFING WINDOWS, PHASE II - WINDOW CODES, STANDARDS, TESTING, CERTIFICATION AND HARMONIZATION, 21

LIFE LEASE OWNERSHIP BY THE ELDERLY OF SUITES WITH CONTINUING CARE SERVICES, 121

LIVING BY WATER GUIDEBOOK, 69

LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING, 39

LONG-TERM OUTLOOK ON THE DEMAND FOR MORTGAGES IN CANADA: SUMMARY REPORT, 105

LOW-TEMPERATURE HYDRONIC HEATING AND HIGH-TEMPERATURE COOLING: A CANADIAN OPTION FOR MORE SUSTAINABLE BUILDINGS, 24

MAJOR MAINTENANCE AND RESIDENTIAL RENOVATION: A SURVEY OF MEANS TO IMPROVE THE ARCHITECTURAL ACCESSIBILITY OF EXISTING BUILDINGS, 108

MANDATORY HOME INSPECTIONS ON RESALE HOMES IN ONTARIO, 65

MANUFACTURED HOUSING CONSULTANTS' TRAINING PROGRAM - PHASE II, 53

MANUFACTURED HOUSING: UPDATING AND REWRITING LOCAL REGULATIONS, 53

MAXIMUM DAY WATER DEMAND REDUCTION MONITORING AND EVALUATION PROJECT, 72

MAXIMUM DAY WATERING DEMAND PHASE II - ASSESSMENT OF WATER CONSERVATION STRATEGIES, 72

METHODS USED ABROAD TO SUPPORT ACCESS TO HOMEOWNERSHIP: A RESEARCH SURVEY: FINAL REPORT, 87

METROPOLIS CENTRES OF EXCELLENCE FOR RESEARCH ON IMMIGRATION ISSUES, 98

MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS, 39

MOLD CLEANUP PROCEDURES: CONTRACTORS' GUIDE, 56

MOLD IN HOUSING: AN INFORMATION KIT FOR FIRST NATIONS COMMUNITIES, 56

MONITORING INNOVATIVE MECHANICAL AND ELECTRICAL SYSTEMS, 39

MONITORING OF THE NORTH ON-SITE WASTE WATER RECYCLING MICROSYSTEMS, 58

MONITORING THE PERFORMANCE OF AN EIFS RETROFIT ON A 15 STOREY APARTMENT BUILDING, 40

MONTRÉAL: A GREAT TRADITION OF MEDIUM-DENSITY HOUSING, 49

MULTIPLE HOUSING FOR COMMUNITY SUSTAINABILITY, 125

NATIONAL RENOVATORS' TRAINING PROGRAM - REVISION 2000, 65

NON-PAYMENT OF RENTS AND THE HEALTH OF THE RENTAL SECTOR IN QUEBEC, 116

NON-REGULATORY INTERVENTIONS FOR ROOMING HOUSES/SROS AND TENANTS, 116

NORTH ABOUT YOUR HOUSE SERIES, 58

NORTH WEB-SITE, 59

NORTHERN HEALTHY HOUSE DEMONSTRATION, 59

NORTHERN HEALTHY HOUSE FEASIBILITY STUDY, 60

NORTHERN HEATING AND VENTILATION SYSTEMS, 29

ONE-STOP APPROVAL FOR MINOR RESIDENTIAL RENOVATIONS, ANDRÉ FORTIN, ARCHITECT, MONTRÉAL, QUEBEC = PROJET D'AUTORISATION INSTANTANÉE POUR LES TRANSFORMATIONS RÉSIDENIELLES MINEURES, ANDRÉ FORTIN, ARCHITECTE, MONTRÉAL (QUÉBEC), 112

2N-SITE STORMWATER MANAGEMENT ALTERNATIVES, 72

ON-SITE WATER QUALITY MONITORING AND CONTROL SYSTEMS, 72

OPERATION AND MAINTENANCE GUIDES FOR MULTI-UNIT RESIDENTIAL BUILDINGS, 41

OPTIMIZING HEAT AND AIR DISTRIBUTION SYSTEMS WHEN RETROFITTING HOUSES FOR ENERGY EFFICIENCY, 25

PENETRATION OF THE MULTIPLE HOUSING SECTOR IN THE UNITED STATES, 101

PERFORMANCE ASSESSMENT OF LOW FLOW TOILETS, 73

PERFORMANCE ASSESSMENT OF THE LEBRETON FLATS DISTRICT HEATING SYSTEM, 29

PERFORMANCE GUIDELINE DEVELOPMENT FOR BASEMENT SYSTEMS AND MATERIALS, 16

PERFORMANCE MONITORING OF A BRICK VENEER/STEEL STUD WALL SYSTEM: PHASE 4 RESULTS: REVISION 1, 41

PERFORMANCE OF PLASTIC AND COMPOSITE MASONRY TIES, 18

PHASE III - DEVELOPMENT OF A SUSTAINABLE COMMUNITY DESIGN CHARRETTE FOR SOUTH EAST FALSE CREEK, VANCOUVER, 125

PHILANTHROPIC SUPPORT FOR AFFORDABLE HOUSING: FINAL REPORT, 96

PRACTICAL MEASURES FOR THE PREVENTION OF BASEMENT FLOODING DUE TO MUNICIPAL SEWER SURCHARGE, 16

PRACTICES FOR SUSTAINABLE COMMUNITIES, 69

PRINCE EDWARD ISLAND BIRTH COHORT STUDY OF MOLD IN HOMES, 51

PRIORITIZED PRACTICAL APPROACHES FOR ESSENTIAL REMEDIATION, REPAIR AND MAINTENANCE PROJECTS, 65

PRO-HOME: A PROGRESSIVE, PLANNED APPROACH TO AFFORDABLE HOME OWNERSHIP, 118

PROJECT TO ENCOURAGE TRIPLEX AND QUADRUPLER HOUSING, CITY OF NANAIMO, BRITISH COLUMBIA = PROJET VISANT À ENCOURAGER LES TRIPLEX ET QUADRUPLER, VILLE DE NANAIMO (COLOMBIE-BRITANNIQUE), 119

PROJECT TO PROMOTE IMPLEMENTATION OF THE NATIONAL BUILDING CODE AND A STANDARDIZED BUILDING PERMIT IN PRINCE EDWARD ISLAND: THE HOME BUILDERS' ASSOCIATION OF PRINCE EDWARD ISLAND = PROJET VISANT À PROMOUVOIR L'ADOPTION DU CODE NATIONAL DU BÂTIMENT ET D'UNE FORMULE UNIFORMISÉE DE DEMANDE DE PERMIS DE CONSTRUIRE À L'ÎLE-DU-PRINCE-ÉDOUARD : LA HOME BUILDERS' ASSOCIATION OF PRINCE EDWARD ISLAND, 17

PUBLIC HOUSING TENANT SELF-MANAGEMENT: AN EVALUATION OF THE ALEXANDRA PARK CO-OP CONVERSION PROCESS IN TORONTO, 85

QUALITY ASSURANCE PROTOCOL TEST DRIVE, 41

RAIN PENETRATION CONTROL: APPLYING CURRENT KNOWLEDGE, 42

RECYCLE: LIFECYCLE - HOW TO RENOVATE A HOME FOR CHANGE, 66

REDUCTION OF AIR INTAKE CONTAMINATION OF HIGH-RISE RESIDENTIAL BUILDINGS, 30

REFINING OF CMHC HOUSING AFFORDABILITY INDICATORS, 97

REGIONAL ROAD CORRIDOR DESIGN GUIDELINES. SOCIO-ECONOMIC RESEARCH HIGHLIGHT; NO. 52, 128

REGULATORY FACTORS IN THE RETENTION AND EXPANSION OF ROOMING HOUSE STOCK: FINAL REPORT, 116

REMOTE MONITORING AND CONTROL OF ON-SITE WASTEWATER TREATMENT, RECYCLING AND RE-USE SYSTEMS, 73

RENOVATING THE HOME FOR ASTHMA: AN INTERVENTION STUDY, 51

RENTERS AND THEIR HOUSING CONDITIONS: FROM THE 1980S INTO THE 1990S - A RETROSPECTIVE, 117

REPAIR AND RETROFIT CASE STUDIES FOR MULTI-UNIT RESIDENTIAL BUILDINGS, 43

REPAIR AND RETROFIT CASE STUDIES OF THE LOFTS CORTICELLI COMPLEX, 43

REQUALIFICATION OF SUBURBS AND REGULATORY FRAMEWORKS: CURRENT SITUATION, 84

RESEARCH AND CONSULTATION PROJECT CONCERNING INUIT HOUSING ACROSS CANADA: FINAL REPORT, 80

RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY, 52



RESEARCH ON SOLUTIONS TO PYRITE-RELATED BACKFILL EXPANSION PROBLEMS, 48

RESEARCH STUDY ON THE HOUSING MARKET IN THE UNITED KINGDOM, 102

RESIDENTIAL DEVELOPMENT IN COASTAL COMMUNITIES: ADDRESSING CLIMATE CHANGE THROUGH SUSTAINABLE COASTAL PLANNING, 119

RESIDENTIAL FOUNDATION SYSTEMS FOR PERMAFROST REGIONS, 60

RESIDENTIAL GREENWAYS IN TRANSITION: FOUR DECADES OF EXPERIENCE IN WATERLOO, 69

RETROFITTING A CITY - LESSONS FROM TORONTO'S BETTER BUILDINGS PARTNERSHIP PROGRAM, 25

REVISION OF HOME CARE: A GUIDE TO REPAIR AND MAINTENANCE, 66

REWRITING TEST STANDARD CAN/CGSB-149.10 - DETERMINATION OF THE AIRTIGHTNESS OF BUILDING ENVELOPES BY THE FAN DEPRESSURIZATION METHOD, 18

ROLE OF CONSTRUCTION CODES IN THE CANADIAN BUILDING SYSTEM, 18

SAMPLE RENOVATION CONTRACT. ABOUT YOUR HOUSE; CE26B, 66

SÉCURITÉ EN CAS D'INCENDIE : PERSONNES À MOBILITÉ RÉDUITE VIVANT EN MILIEU RÉSIDENTIEL RÉGULIER, 121

SEISMIC PERFORMANCE OF RAINSCREEN STUCCO, 19

SEMINARS ON SENIORS' HOUSING TO THE RESIDENTIAL CONSTRUCTION AND HEALTH CARE SECTORS, 122

SERVICE LIFE OF MULTI-UNIT RESIDENTIAL BUILDING ELEMENTS AND EQUIPMENT, 19

SKILL SHORTAGES IN THE RESIDENTIAL CONSTRUCTION INDUSTRY, 92

SOIL AND FLORA RESTORATION AFTER GROUND DISTURBANCE, 70

SPACE EFFICIENT UNIVERSAL DESIGN INNOVATIONS, 108

SPECIAL STUDIES ON 1996 CENSUS DATA, 94

STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS, 20

STATE AND PROVINCIAL AFFORDABLE HOUSING MANDATES AND MEASURES, 97

STUDY OF DISPLACEMENT VENTILATION SYSTEMS FOR RESIDENTIAL HOUSES WITH RADIANT FLOOR HEATING SYSTEMS, 52

STUDY OF SPATIAL ORIENTATION IN A RESIDENTIAL COMPLEX FOR SENIORS WITH OR WITHOUT COGNITIVE DISORDERS, 122

STUDY OF TENANT EXITS FROM HOUSING FOR CHRONICALLY HOMELESS PEOPLE, 91

STUDY ON THE HOUSING SECTOR'S PRODUCTIVITY GROWTH, 92

STUDY ON THE RESIDENTIAL INTEGRATION OF IMMIGRANT YOUTH IN MONTRÉAL, 98

STUDY ON U.S. RENOVATION MARKET, 102

SUMMARY REPORT FOR CONSORTIUM ON FIRE RESISTANCE AND SOUND INSULATION OF FLOORS: SOUND TRANSMISSION CLASS AND IMPACT INSULATION CLASS RESULTS, 15

SURREY'S USE OF INTERACTIVE TOUCH-SCREEN TECHNOLOGY TO EXPEDITE CLIENTS REQUESTS FOR BUILDING PERMIT AND DEVELOPMENT PROCESS INFORMATION: THE CITY OF SURREY PLANNING AND DEVELOPMENT DEPARTMENT = UTILISATION DE LA TECHNOLOGIE INTERACTIVE À ÉCRAN TACTILE PAR LA VILLE DE SURREY AFIN D'ACCÉLÉRER LE TRAITEMENT DES DEMANDES DE PERMIS DE CONSTRUIRE ET D'INFORMATION SUR LE PROCESSUS D'AMÉNAGEMENT : SERVICE D'URBANISME ET D'AMÉNAGEMENT DE LA VILLE DE SURREY, 113

SURVEY OF CANADIAN MUNICIPALITIES: REGULATORY MEASURES FOR HOUSING AFFORDABILITY AND CHOICE, 114

SURVEY OF MULTI-UNIT RESIDENTIAL BUILDING CHARACTERISTICS AND ENERGY USE DATA, 25

SUSTAINABLE BUILT ENVIRONMENTS: A STUDY OF INDUSTRY VIEWS, 126

SUSTAINABLE COMMUNITY PLANNING AND DEVELOPMENT: PARTICIPATION TOOLS & PRACTICES: FINAL REPORT, 126

SUSTAINABLE INTEGRATION OF INFRASTRUCTURE AND BUILDINGS IN MAASTRICHT, THE NETHERLANDS, 127

TECHNICAL ASPECTS OF SELLING NEW HOMES, 44

TECHNICAL AUDIT COURSE FOR PROPERTY MANAGERS, 62

TECHNOLOGY DISSEMINATION: TRIGGERING INNOVATION ADOPTION IN CANADA'S HOME CONSTRUCTION INDUSTRY, 48

TECHNOLOGY ROAD MAP FOR INTELLIGENT BUILDINGS TECHNOLOGIES, 43

TESTING CONSUMER RECEPTIVITY TO SUSTAINABLE COMMUNITY DESIGN FOR A DEMONSTRATION -BUILD SITE IN OKOTOKS, ALBERTA, 127

THERMOSTAT SETTINGS IN HOUSES WITH IN-FLOOR HEATING, 30

TRENDS AND CHANGES IN JAPANESE BUILDING REGULATIONS, 102

TRENDS IN THE JAPANESE HOUSING MARKET, 103

UNDERSTANDING AND DEALING WITH INTERACTIONS BETWEEN TREES, SENSITIVE CLAY SOILS AND FOUNDATIONS. ABOUT YOUR HOUSE; CE31, 17

UNDERSTANDING THE ROLE OF MIXED INCOME HOUSING: AN EXAMINATION OF THE HOUSING SITUATION OF MARKET TENANTS LIVING IN SOCIAL HOUSING COMPARED TO MARKET TENANTS LIVING IN PRIVATE RENTAL HOUSING, 122

UPDATE THE NORTHERN UTILITY COSTS REPORT, 60

UPDATING THE AIRTIGHTNESS TESTING STANDARD, 26

URBAN ABORIGINAL MOBILITY COLLOQUIA/WORKSHOPS/SURVEY PLANNING, 80

URBAN ABORIGINAL PERCEPTIONS OF ACCESS TO HOUSING, 81

USE OF COMPRESSED-AIR-FOAM TECHNOLOGY FOR FIRE PROTECTION OF HOUSING IN THE NORTH, 61

USE OF ON-SITE WASTE WATER RECYCLING MICROSYSTEMS FOR SPRINKLER SUPPLY, 61

VIRTUAL SAMPLE ROOM WEB SITE OF GREEN BUILDING MATERIALS - PHASE II, 19

WATER QUALITY MONITORING OF THE TORONTO HEALTHY HOUSE, 73

WOOD USE STUDY IN STRAW BALE BUILDING, 48

YOUR NEXT MOVE: CHOOSING A NEIGHBOURHOOD WITH SUSTAINABLE FEATURES, 127

YOUR SEPTIC SYSTEM. ABOUT YOUR HOUSE; CE34, 74

YUKON FLEX/HEALTHY HOUSING DEMONSTRATION, 62

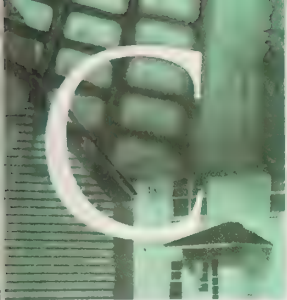






Visit our Web site at: [www.cmhc-schl.gc.ca](http://www.cmhc-schl.gc.ca)





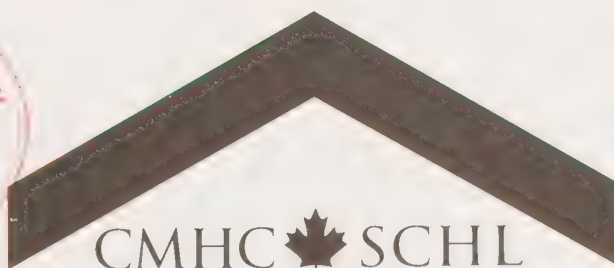
Publication

# CURRENT HOUSING RESEARCH

VOLUME 9, NUMBER 1

SUMMER 2002

**SOCIAL,  
ECONOMIC AND  
TECHNICAL  
RESEARCH**



HOME TO CANADIANS  
Canada



# CURRENT HOUSING RESEARCH

Volume 9 Number 1  
Summer 2002



Issued also in French under the title: ***Recherches courantes sur l'habitation***

Publié aussi en français sous le titre: ***Recherches courantes sur l'habitation***

## CURRENT HOUSING RESEARCH ORDER FORM

If you wish to receive any of the completed reports or bibliographies listed, or if you would like to be on the mailing list to receive *Current Housing Research*, please fill out this form and send it to:

Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa ON K1A 0P7  
Fax (613) 748-4069  
Telephone 1-800-668-2642  
Email: [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)

### COMPLETED REPORTS REQUESTED


### BIBLIOGRAPHIES REQUESTED


☐ Send copies of above reports/bibliographies

☐ Add my name to your mailing list to receive *Current Housing Research*

Name

Mailing Address

City

Province

Postal Code





## INTRODUCTION

Welcome to "*Current Housing Research*". This publication merges "*Housing Research Quarterly*" and "*Current Housing Technology Initiatives*" and continues the numbering of the "*Housing Research Quarterly*".

Under Part IX of the National Housing Act the Government of Canada provides funds to Canada Mortgage and Housing Corporation to conduct research into the social, economic and technical aspects of housing and related fields.

*Current Housing Research* is compiled and produced three times a year by the Canadian Housing Information Centre. This publication provides information and access to research which is undertaken and sponsored by the Corporation. It is also available on CMHC's Website at [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)

The publication contains information on completed research reports, new publications, videos and bibliographies, as well as planned and ongoing research projects. An alphabetical title index of items listed is included at the end for quick reference.

The overall arrangement of "*Current Housing Research*" is by broad subject category. Within each subject category, lists of planned and ongoing projects and completed research reports are described.

Each entry can contain the following elements:

- The project or report title;
- A description of the project or report results;
- The CMHC Project Officer who is managing the project;
- The Division within CMHC which is responsible for the project;
- For External Research Projects, the grant recipient undertaking the research;
- A Contract Identification Number (CIDN);
  
- The Status of the project: whether the project is in a planned, ongoing or completed phase.  
"Planned Projects" are those that are not yet underway, but are likely to be initiated in the current year. "Ongoing Projects" refer to research projects which are currently underway. No reports are yet available. Once the project is completed, and a report is available for distribution, it will be listed as a "completed report."
  
- Whether the report resulting from the research project is available and the address where the completed report can be obtained.

To discuss research projects that are recent or ongoing, please call CMHC General Inquiries at (613) 748-2000 and ask for the CMHC Project Officer identified under each project description.



## CMHC'S EXTERNAL RESEARCH PROGRAM

The objective of the CMHC External Research Program (ERP) is to encourage and enable researchers in the private and not-for-profit sectors to put forward and carry out relevant, innovative, and high quality housing research projects. Under the Program, financial contributions are made to support research investigations into important questions, problems, and issues affecting Canadian housing. Housing research priority areas are identified in the "External Research Program Grants for Housing Research Guidelines and Application Form".

Applicants to the External Research Program must be Canadian citizens or have permanent resident status in Canada.

Independent researchers as well as those employed in Canadian universities, institutions, private consulting firms, the professions and the housing industry may apply for these grants.

Full-time students at the graduate or undergraduate level are not eligible to apply. Students may be hired to assist in the conduct of the research, but under no circumstances may they take over responsibility for the direction of the work or the quality of the final report.

Individuals who are full-time federal, provincial or municipal government employees may apply. However, to be eligible, an applicant must provide a letter of support from her/his employer which shows that the proposed research is not part of, and will not interfere with, her/his regular work. CMHC employees are not eligible to receive grants under this Program.

CMHC is interested in receiving applications on topics related to its housing research priority areas. New ideas and innovative approaches in these areas are welcome.

To obtain the booklet outlining the priority research areas, the guidelines and application form for the External Research Program you may contact:

The Administrator  
CMHC External Research Program  
Research Division  
Canada Mortgage and Housing Corporation  
700 Montreal Road, Room C7-307  
Ottawa, Ontario  
K1A 0P7  
Telephone: 613-748-2249  
Fax: 613-748-2402  
E-mail: [erp@cmhc-schl.gc.ca](mailto:erp@cmhc-schl.gc.ca)





## TABLE OF CONTENTS

	PAGE
Order Form	I
Introduction	2
Subject Index	5
Technical research	7 - 56
Social and Economic Research	57 - 94
Bibliographies	95 - 99
Title Index	100 - 109





## SUBJECT INDEX

Aboriginal Housing .....	7, 59	Housing Design .....	35
Acoustics .....	9	Housing Export Opportunities .....	75
Basements, Foundations & Crawl Spaces ..	9	Housing Forecasting and Demand .....	78
Building Codes & Standards .....	10	Housing Market .....	78
Building Materials .....	11	Housing Research .....	79
Children's Environments .....	62	Indoor Environment .....	37
City Planning and Human Settlements ..	63	Manufactured Housing .....	40
Concrete .....	12	Moisture and Mold .....	41
Consumer Protection .....	64	Mortgages and Housing Finance .....	80
Contaminated Lands .....	13	Northern Housing .....	43
Co-operative and Non-profit Housing ...	64	Persons with Disabilities .....	80
Discrimination in Housing .....	74	Population Health .....	82
Doors and Windows .....	13	Property Management .....	48
Energy Conservation .....	14	Regulatory Reform .....	82
Fires & Fire Prevention .....	19	Renovation and Inspection .....	49, 83
Heating and Ventilation .....	20	Rental Housing .....	84
High-Rise and Multiple Unit Construction	23	Residential Development .....	86
Home Ownership .....	32, 66	Seniors .....	86
Homelessness .....	66	Social Housing .....	89
House Construction .....	32	Sustainable Development & Healthy	
House Construction Industry .....	68	Housing .....	52, 89
Housing .....	70	Water Conservation, Reuse &	
Housing Affordability .....	72	Management .....	53
Housing and Immigration .....	74	Women and Housing .....	92
Housing and Taxation .....	74	Youth and Housing .....	92



## TECHNICAL RESEARCH





**ABORIGINAL HOUSING: LOCAL DESIGN AND MATERIAL**

This project responds to opinion that house designs found in Aboriginal communities are inappropriate and that perfectly good building materials exist on reserve but are never used. The project assumes that in fact there are a significant number of examples where appropriate designs have been put in place and where the potential use of local material has been investigated. The project will identify these examples, and document a selected number of them as case studies. The case studies will produce material suitable for dissemination.

The general approach is:

- to build an inventory of past initiatives on increasing the Aboriginal relevance of housing design and on assessing the feasibility of using local materials;
- to select a range of examples from the inventory for case study analysis; and
- to draw conclusions along the lines of "lessons learned".

**CMHC Project Officer :** *Phil Deacon*

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**DEMONSTRATION OF HEALTHY HOUSING ON RESERVE**

This project is being undertaken in partnership with First Nations communities. The objectives are to support the design, construction and demonstration of five on-reserve Healthy Houses near Montreal, Belleville, Thunder Bay, Winnipeg, and on band land in N'Dilo and Dettah near Yellowknife. To date, four houses have been built and demonstrated in the following communities - Kanawake QC, Eagle Lake ON, Roseau River MB, plus several micro-sewage treatment systems in NT. Native communities own and occupy these demonstration houses, which were constructed by locally trained trades and specialists. A goal of the project was to better equip First Nations community and other decision makers, and the public to understand the importance of constructing more affordable, appropriate and environmentally sustainable housing. A CMHC report will be produced detailing house costs and benefits, designs and systems at the completion of the project. An About Your House summary has already been published which describes the Eagle Lake Healthy House and its matching "EcoNomad" utilities container. A 30 minute video has also been prepared which describes the Kanawake Healthy House and their plans to build a "sustainable subdivision" of 27-35 homes on a ten acre "ecovillage" site. The Tyendinaga Mohawks (near Belleville ON) have already built four Granny Houses and five Seniors homes which meet Healthy Housing IAQ goals (Indoor Air Quality). This community is now preparing to design and build a "sustainable subdivision" of some 36 homes. The N'Dilo and Dettah communities have installed micro-sewage systems in a number of homes, following the demonstration and testing of a prototype micro-system in a single family house. The performance of these micro-systems is now being monitored in collaboration with the NWT Housing Corporation and an evaluation report has been prepared by UMA Engineers under contract to the City of Yellowknife.

**CMHC Project Officer :** *Chris Ives*

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### FIRST NATIONS HEALTHY HOUSING SUSTAINABLE COMMUNITY DEVELOPMENT SYMPOSIUM, AND UPDATE OF THE 'BEST PRACTICES' PUBLICATION

This project's objective is to organize and facilitate a two day First Nations Healthy Housing and Sustainable Community Development Symposium and to update the 'Best Practices' publication.

**CMHC Project Officer :** Alain Croteau

**CIDN :** 2497 1500002

**Division :** Assisted Housing Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### NATIVE INSPECTION SERVICES INITIATIVE (NISI) GUIDE

Over the years, First Nations throughout Canada have become increasingly interested in being involved in inspecting renovations and new homes in their territories. To address this desire, CMHC developed the Native Inspection Services Initiative (NISI) in 1995, to provide greater First Nation involvement in inspections for CMHC programs and to help build First Nation inspection capacity. Building inspection capacity is an important step in improving First Nations' housing quality.

This Guide explains the requirements of NISI and is a reference guide to inspection for NISI inspectors and organizations. CMHC will continually update the Guide and plans to put the Guide and updates to it on the CMHC web site.

*Developed by the Southern First Nations Secretariat, Ontario. CMHC Project Officer: Alain Croteau. Ottawa: Canada Mortgage and Housing Corporation, 2001. 90 pages*

**NOTE :** Aussi disponible en français sous le titre : Guide sur l'initiative des services d'inspection autochtones (ISIA)

**STATUS :** New Completed Report

**AVAILABILITY :** On a loan basis from the Canadian Housing Information Centre

### SUSTAINABLE COMMUNITY SITE PLAN, INFRASTRUCTURE PLAN AND HEALTHY HOUSE DESIGNS

The objective of this project is to develop a sustainable community site plan, infrastructure plan and healthy house designs for approximately thirty homes in cooperation with the community of Tyendinaga. The intention of this project is to demonstrate that when alternative infrastructure options, land use patterns and high performance homes are explored simultaneously as an integrated design solution that improvements can be made in all these categories without an overall price increase. The integrated participatory design process will include community workshops involving both the immediate community as well as the broader Ontario First Nations community and design professionals. The results of the workshops and the resulting community and house designs will be published in a report and the first healthy high performance home will be available for public viewing for a period of one year.

**CMHC Project Officer :** Doug Pollard

**CIDN :** 2408 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***



### NOISE ISOLATION PROVIDED BY GYPSUM BOARD PARTITIONS

The objective of this project was to analyze the results of 350 sound transmission tests conducted on gypsum board partitions of various compositions. The results of these tests were published in report no. 761 produced by the Institute for Research in Construction of the National Research Council of Canada. This report conveys the conclusions of the analysis; it highlights the main factors influencing the performance of gypsum board partitions: the gypsum boards themselves, the studs and stud arrangements, the resilient furrings, and the sound absorptive materials inserted in the cavity.

*Prepared by MJM Acoustical Consultants Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Jacques Rousseau. Ottawa: CMHC, 2002. 169 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## BASEMENTS, FOUNDATIONS & CRAWLSPACES

### COMPREHENSIVE STUDY ON SLAB-ON-GRADE FOUNDATIONS

The purpose of this project is to investigate and provide answers to technical questions on slab-on-grade insulation, moisture protection, and heating systems appropriate to be used with such a foundation type, and cost effectiveness in various climate regions of Canada. Other aspects to be studied will be: consumer acceptance of this type of "basementless" house; alternate layout designs to accommodate storage; overall pros and cons of the alternative house foundation type.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 2275 0200

**Division :** Policy and Research Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

### INSULATED CONCRETE FORMS TRAINING PROGRAM

This is a multi-partnered project led and managed by the Cement Association of Canada (CAC). Participants include the Portland Cement Association (PCA), Insulating Concrete Form Association (ICFA), National Energy Conservation Association (NECA), Alliance of Canadian Building Officials Association (ACBOA), Association of Canadian Community Colleges (ACCC), Seneca College, Southern Alberta Institute of Technology (SAIT), Atlantic Home Builders' Training Board (AHBTB), Canadian Carpentry Union, CHBA, NRCan and CMHC. The purpose of this project is to develop and pilot a course curriculum and course training materials on how to properly construct insulated form foundation and building systems (ICFs). The course will consist of two modules; Introduction to Insulated Concrete Form Construction, and Fundamentals of Concrete Footings and Foundations. It will be promoted to ICF installers, home builders, home inspectors, building officials, and the trades involved in the installation of ICFs. The course will be developed and piloted in two phases over a two year period from 2000 to 2002 and the third phase will be implementation of the training program into various educational institutions across the country in 2002-2003. The training materials for the two modules have been drafted and the pilots have begun. Once the pilots are completed the materials will be finalized based on the feedback from the participants and instructors. Discussions with educational institutions are also underway.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2411 020001

**Division :** Policy and Research Division

**STATUS :** Ongoing

## BASEMENTS, FOUNDATIONS & CRAWLSPACES

### PERFORMANCE GUIDELINE DEVELOPMENT FOR BASEMENT SYSTEMS AND MATERIALS

CMHC is a participant contributing research to this multi-disciplinary, multi-agency study led by the National Research Council identifying knowledge gaps in the performance of basement systems. Field work is complete and guidelines are being developed for design, construction and evaluation of basement materials and systems to ensure their durability and long-term performance. CMHC will look into ways to inform builders and the public about better basement designs.

**CMHC Project Officer :** Don Fugler

**CIDN :** 1421 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### PRACTICAL MEASURES FOR THE PREVENTION OF BASEMENT FLOODING DUE TO MUNICIPAL SEWER SURCHARGE

This External Research Program (ERP) project is to study practical measures currently available to homeowners experiencing basement flooding due to sewer surcharges. The research will include a survey of municipalities to discover how commonly this type of flooding occurs. The consultants will also analyze existing devices or measures to prevent sewer surcharge, and to draft advice for householders and builders on the more successful solutions identified.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2437 0200010

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## BUILDING CODES

### DEVELOPMENT OF TRANSITION TRAINING FOR OBJECTIVE-BASED CODES

Under the auspices of the Canadian Commission on Building and Fire Codes (CCBFC), CMHC is contributing to a partnership of National Building Code stakeholders to develop training and education curricula and course content which will include training validation and pilot testing. Content will provide for training on the structure and new information to be included in the 2004 objective-based code, on the evaluation of alternative solutions to be allowed under objective-based codes (e.g., using sprinklers in lieu of fire separations), on assessment criteria to allow for transferability of alternatives and their impact on other code requirements, on preparation of knowledge tests, on development of an instructor's guide, and on pilot testing. As provincial, territorial and municipal code enforcement officials have the most comprehensive information requirements, material will be developed at their level and then adapted by other stakeholder groups to meet their needs. This project will develop according to the following schedule: Year 2002 - Training needs assessment, Year 2003 - Development of training material, Year 2004 - Pilot-test and finalize training material.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2700 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Seminar/training is not yet available **\*NEW\***

## BUILDING CODES

### REWRITING TEST STANDARD CAN/CGSB-149.10 - DETERMINATION OF THE AIRTIGHTNESS OF BUILDING ENVELOPES BY THE FAN DEPRESSURIZATION METHOD

The airtightness standard used for testing houses dates back to 1986. The object of this project is to re-write CAN/CGSB-149.10, incorporating some updates and some alternative techniques. There have been no meetings up until now but there has been extensive consultation by e-mail and document review. Progress has been delayed due to the lack of consensus by committee members. The contractor who assembled the new draft of the document is looking into modifications of the text to satisfy some of the objections.

**CMHC Project Officer :** Don Fugler

**CIDN :** 1971 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## BUILDING MATERIALS

### COMPOSITE MASONRY WALL TIES: FINAL REPORT

This project aimed at developing a prototype masonry tie using composite materials, which would fulfill structural requirements, be immune to corrosion and manufactured at a lesser cost. The project originated from the fact that current galvanized masonry ties do not meet new standards. The alternative, stainless steel ties are 80% to 100% more expensive.

Several prototypes were developed and tested, concluding that an adjustable tie can be manufactured from glass fibre reinforced polymer composite (GFRPC). Specifically, the most promising tie would be used between masonry veneer and a concrete block backup wall system with 50 mm air space and 50 mm rigid insulation. The investigator made prototypes that meet current standards and show promise that they could be manufactured competitively.

*Prepared by Vera Straka, Dept. of Architectural Science, Ryerson University. CMHC Project Officer: Luis de Miguel. Ottawa: Canada Mortgage and Housing Corporation, 2002. (External Research Program Research Report) 51 pages*

**NOTE:** No. 02-109 in the Research Highlights Technical Series summarizes the results of the research and is available on the CMHC web site

**STATUS :** New Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre



## BEST PRACTICE GUIDE FOR PRE-CAST CONCRETE WALLS

The objective of this project is to develop a practical, advisory document for designers, architects and engineers, and manufacturers, related to precast wall panels in residential applications. Precast is a well developed system in commercial applications but it requires special treatment when used in housing. The project will be conducted in partnership with the Canadian Precast and Prestressed Concrete Institute, installers and their associations. This Guide will be produced as a joint publication through a collaborative project with Public Works Government Services Canada. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to precast walls, construction details in AutoCAD format, outline specifications and additional sources of information and references.

**CMHC Project Officer :** *Luis de Miguel*

**CIDN :** 2215 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS

This study was initiated to address concerns raised at a round-table discussion convened by Canada Mortgage and Housing Corporation to discuss concrete deterioration and repair issues for buildings. It was generally agreed that there is no consistent approach to concrete investigations and repairs and that the development of an assessment and repair protocol would be beneficial. In achieving a concrete repair protocol, the first step is to identify the state-of-the-art and the current practice for investigation, repair and monitoring strategies. State-of-the-Art is considered to be the highest level of technology in the field at this time and Current Practice is considered to be the procedures that are in general or prevalent use by most consultants. This project will research current assessment, monitoring and repair strategies for concrete repair employed by engineering consulting firms commonly involved in concrete investigation and restoration projects. Existing protocols commonly used in the field as well as existing protocol guidelines assembled by various agencies (e.g. CSA) will be catalogued. This project is expected to be completed by end of summer 2002.

**CMHC Project Officer :** *Silvio Plescia*

**CIDN :** 1890 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CONTAMINATED LANDS

### DEMONSTRATION OF SAFE HOUSING ON LIGHTLY CONTAMINATED LANDS

CMHC research into contaminated lands shows that some types of soil contaminants could be rendered innocuous through building design and operation. One example is heavy metals deep within the soil. If these pollutants can be avoided through design, the cost of land remediation could be greatly reduced. The project will include contaminant monitoring and the investigation of the predictive capabilities of site specific risk assessments. Two of the three case studies are complete: a potential soil gas movement problem in a Vancouver high-rise and heavy metals moving from fill in the vicinity of Wells, BC. A third potential location has been identified in the Yukon. Testing will have to follow construction of the houses, which may not take place until 2003.

**CMHC Project Officer :** Don Fugler

**CIDN :** 1946 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## DOORS AND WINDOWS

### LEAK-PROOFING WINDOWS, PHASE I - FABRICATION, INSTALLATION AND MAINTENANCE

Recent CMHC surveys including "The Survey of Building Envelope Failures in the Coastal Climate of British Columbia" and "Wall Moisture Problems in Alberta Dwellings" revealed that exterior moisture penetration through and/or around windows (at window wall interfaces) is a significant contributor to the envelope moisture problem. The objective of this project is to undertake a study which identifies the nature and causes of moisture ingress problems associated with windows and window to wall interfaces. The study will answer four key questions: 1. What are the important leakage paths associated with windows? 2. What are the primary causes of these leakage paths? 3. What are the key improvements that need to be made to address these leakage paths and causal factors? and 4. What industry sector can best address these improvements? This project, funded by Canada Mortgage and Housing Corporation in partnership with the Homeowner Protection Office and British Columbia Housing Management Commission, is expected to be completed by the end of summer 2002.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2285 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### LEAK-PROOFING WINDOWS, PHASE II - A REVIEW OF STANDARDS TESTING AND CERTIFICATION

Recent CMHC surveys including "The Survey of Building Envelope Failures in the Coastal Climate of British Columbia" and "Wall Moisture Problems in Alberta Dwellings" revealed that exterior moisture penetration through and/or around windows (at window wall interfaces) is a significant contributor to the envelope moisture problem. The objective of this research project, funded by Canada Mortgage and Housing Corporation in partnership with the Homeowner Protection Office and the British Columbia Housing Management Commission, will be to conduct a detailed review of the Canadian Window Standard CSA A440, together with all its attachments, to review the test requirements related to moisture penetration as outlined in the standards, and to review, assess and evaluate the window certification programs and processes. This research project will identify recommended solutions and opportunities for alleviating these moisture problems into the wall assembly from the window/wall interface. This study will complement a companion study "Leakproofing Windows, Phase I - Fabrication, Installation and Maintenance" in which the primary window leakage paths and causal factors are identified from insitu window-wall performance records.

The CSA A440 Window Standards Committee is considering the adoption of and harmonizing with the North American Fenestration Standards (NAFS). This project will also attempt to consolidate the potential impact that NAFS may have on the performance of windows if adopted by the window standards committee.

This work is underway and is anticipated to be completed by the end of 2002.

**CMHC Project Officer :** Silvio Plescia

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2425 0200001

**STATUS :** Ongoing

## ENERGY CONSERVATION

### ALTERNATIVE HOME ENERGY SOURCES FOR THE NORTH

This is a partnership project between Alaska Housing Finance Corporation, Arctic Energy Alliance and CMHC. Access to alternate energy in the North was an important issue identified in the 1998 Client Consultation. While much literature exists on alternative home energy sources, most of it is too complex for general comprehension. Further, much of this information has not been verified for applicability to the North including availability and performance of alternative energy products in the North. This project will provide a full summation of options, a cost benefit analysis based upon present individual utility infrastructures and costs as well as regional climatic requirements, reference and contact information.

**CMHC Project Officer :** Aleta Fowler

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2312 0200003

**STATUS :** Ongoing



## ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS

An energy and greenhouse gas emission simulator will be developed to model the impacts of energy efficiency measures on large buildings. The energy simulator will be capable of analyzing the impact of individual, or packages of, energy efficiency measures on the energy consumption and greenhouse gas emissions of large commercial and multi-unit residential buildings. Regional and national energy and greenhouse gas emission reductions will be assessed by using the simulator to evaluate the impact of energy efficiency measures on the buildings in a representative building database. The results of the analysis will then be projected to national levels to determine the extent of retrofit measures that are required within the building stock to meet the reduction targets set by the Kyoto Protocol in December 1997.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2249 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CASE STUDIES OF MAJOR HOME ENERGY RETROFITS

To meet targets for greenhouse gas production in Canada, the residential sector will have to significantly reduce energy consumption in existing houses. A 1995 CMHC report suggested that houses built prior to 1989 will have to reduce energy consumption on average by about 40%. This is a big reduction, one that is rarely realized in programs funded by government or the utilities. The object of this research is to see whether four or more relatively normal houses can have their total energy usage reduced by 40%. Saskatchewan Research Council has been hired to determine this. The houses have been selected and the retrofits contracted by the owner were completed by December 2001. The next year of monitoring should establish whether the 40 % goal can be achieved.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2349 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CHARACTERIZATION OF ENERGY AND WATER END-USE LOAD PROFILES IN HOUSING: LITERATURE REVIEW

CMHC, in cooperation with Natural Resources Canada, is in the process of conducting a literature review of energy and water end-use load profiles, interior heat gain, monitoring and analysis methodologies in residential buildings. The objective of this project is to identify what data is available on energy and water end uses so that the available data can be compiled and future monitoring projects can be formulated to supplement existing information. CMHC has engaged the Centre for Residential Energy End Use Data Analysis Centre from Dalhousie University to conduct the literature search. This work will clearly identify research projects, data, monitoring protocols and published information relating to energy and water load profiles of housing. Based on the outcome of this project, CMHC and NRCan will be able to identify sources of load profile data to construct energy and water load profiles on a 15 minute basis and will be able to organize research projects to gather load profile data where it does not currently exist.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2201 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is in the process of documenting the application of energy efficiency measures in multi-unit residential buildings to be used as case studies. A trial case study of a housing co-operative in Ottawa is underway, to not only assess the strengths and weaknesses of the energy efficiency measures implemented, but also to identify what information can be disseminated to others in the building industry. Upon completion of this first case study, CMHC will be soliciting the housing industry for additional energy efficiency case studies. A compendium of case studies will be made available from CMHC. The case studies will also support the Energy Efficiency Opportunities Manual for Multi-Unit Residential Buildings that CMHC is in the process of developing. The case studies currently underway include:

1. Conservation Co-op, Ottawa
2. Dual Fuel Heating System, Oshawa
3. Energy Efficiency Retrofit of an Apartment Building, Toronto
4. Case Studies of Interior Insulation Retrofits in Buildings with Solid Masonry Walls (CMHC "A" Building, Ottawa; Lofts Corticelli, Montréal; Karcher Building, Prince Albert)
5. The Complete Rehabilitation of the Broadview Apartment building.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1899 0200002-3

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ENERGY EFFICIENCY OPPORTUNITIES MANUAL FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC, in partnership with the Ontario Ministry of Municipal Affairs and Housing (OMMAH), has developed a manual that details energy and water efficiency measures for existing multi-unit residential buildings. The document is based on a manual originally developed by the Ontario Ministry of Housing in the early 1980's. The new manual offers proven, current energy efficiency measures for the building envelope, mechanical, electrical, and domestic hot water heating systems. A web-based version of the manual has been developed that has been installed on the CMHC web-site. Individual energy and water efficiency measures have been placed on the high-rise website as they are developed. The measures have been publicized as the energy and water efficiency "Tip of the Week" (<http://www.cmhc-schl.gc.ca/en/imquaf/himu/wacon/waensatip/index.cfm>). The production of the web-based, and translated, version has also allowed for a simultaneous final editing of the manual in preparation for publication.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1887 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ENERGY GENERATION AND CONTROL AT THE BUILDING ENVELOPE OF MULTI-UNIT RESIDENTIAL BUILDINGS

This project's objective is to evaluate strategies to reduce, generate or recover and redistribute energy at the building envelope of multi-unit residential buildings.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2521 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## ENERGY CONSERVATION

### ENERGY USE OF STRAW BALE BUILDINGS WITH COMPARABLE BUILDINGS OF CONVENTIONAL CONSTRUCTION

This survey compares the measured energy consumption of straw bale buildings with similar buildings of conventional construction. The contractor examined the billing data of eleven straw bale buildings that used measurable heating energy (gas, oil, or electric). He then modelled conventional buildings of the same interior dimensions built to BC Building Code, using the HOT2000 program. The results show that nine of eleven straw houses studied use less energy than their modelled counterparts, with the average reduction in the order of 20%. These savings are substantially larger than the possible errors due to computer modelling imprecision.

**CMHC Project Officer :** Don Fugler

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2441 0200003

**STATUS :** Ongoing

**\*NEW\***

### FINANCIAL TOOLS FOR CO2 REDUCTION

This project responds to Canada's planned Kyoto commitment to take actions that will help reduce CO2 emissions. The research examines a number of financial measures that have been used in Canada and the US to encourage and accelerate the adoption of energy efficiency measures for existing and new housing.

**CMHC Project Officer :** Fanis Grammenos

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2281 0200001

**STATUS :** Ongoing

### HYGROTHERMAL MODELLING OF THE INTERIOR INSULATION RETROFIT OF A SOLID MASONRY BUILDING

In 1997, CMHC was involved in the renovation of a building with solid masonry walls. Part of the renovation involved the addition of insulation to the interior of the solid masonry walls. This retrofit technique is contentious within the construction industry as it is thought to cause wall durability problems due to freeze thaw cycles, interstitial condensation and thermally induced stresses. Monitoring of the project shows that the wall systems are thus far performing well. CMHC has engaged a consultant to use a hygrothermal modelling tool to assess the degree to which the tool can track the wall performance monitoring conducted to date and to assess the long-term performance of the retrofitted wall system. If the model can be configured to provide a reasonably accurate assessment of the heat, air and moisture regimes within the wall assembly, the project will be extended to assess the performance of the retrofit strategy under different environmental conditions.

**CMHC Project Officer :** Duncan Hill

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 1730 0300005

**STATUS :** Ongoing

**\*NEW\***



## OPTIMIZING HEAT AND AIR DISTRIBUTION SYSTEMS WHEN RETROFITTING HOUSES FOR ENERGY EFFICIENCY

When a house undergoes energy upgrading, either by improving the envelope or the heating appliance, one factor often overlooked is the heating or ventilating distribution system. With support from the Program for Energy Research and Development (PERD), CMHC will be undertaking research into distribution system upgrades, probably in conjunction with other federal agencies. The first stage of this work is a review of the performance characteristics of current and innovative distribution systems. The review will establish the operating characteristics of HVAC equipment and distribution systems. This includes both old, existing systems; current, off-the-shelf components; and new distribution systems coming on the market. As well, this review identifies problems with the integration of upgraded heating or cooling systems and existing energy distribution systems in houses. The output of this project will help guide the next phases of the work: laboratory studies, field studies, and demonstrations. A draft report on the literature review has been submitted and has been circulated for comment. New funding has been approved to start the field research.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2440 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RETROFITTING A CITY: A GUIDE FOR MUNICIPALITIES TO IMPLEMENT A BUILDING RETROFIT PROGRAM

The primary goal of this project was to help municipalities across North America improve energy efficiency in buildings and reduce their greenhouse gas emissions. Based on Toronto's successful Better Buildings Partnership Program the project produced this useable manual for designing and implementing municipal building retrofit programs to improve water and energy efficiency. Building retrofits can reduce greenhouse gas emissions by lowering energy consumption. Undertaken on a wide scale, retrofitting buildings can enhance the sustainability of urban centres by diminishing air pollution locally and slowing the rate of consumption of natural resources.

Building energy retrofits should follow a process which includes the following steps:

- Audit: a study of the building and the way it uses energy which leads to a definition of appropriate measures;
- Implement: the implementation of the measures including engineering, project management, subcontracting, and commissioning;
- Monitor: the monitoring and tracking of energy savings to be sure they are achieved as expected, and they are sustained.

This process, and the steps on which it is based, are described in detail throughout the manual.

*Designed and written by Bob Bach and Marjorie Lamb. Canada Mortgage and Housing Corporation, Enbridge Consumers Gas, and Ontario Power Generation sponsored the project. CMHC Project Officer: Brian Eames. Ottawa: CMHC, 2001. 44 pages*

NOTE 1 : Aussi disponible en français sous le titre : Rattrapage éconergétique d'une ville : guide proposant aux municipalités des moyens de mettre en oeuvre un programme de rattrapage des bâtiments

NOTE 2: No. 105 in the Research Highlights Socio-economic Series summarizes the results of the research and is available on the CMHC web site

**STATUS :** New Completed Report and Research Highlight

**AVAILABILITY :** Product is available on the web

## ENERGY CONSERVATION

### SURVEY OF MULTI-UNIT RESIDENTIAL BUILDING CHARACTERISTICS AND ENERGY USE DATA

This project involved the collection of the physical and operational characteristics of 40 multi-unit residential buildings from all regions in Canada. Energy and water consumption histories for the past 2 to 3 years have also been collected for each building. The survey portion of this work is now complete. CMHC has developed a database (HiSTAR) to store the building files and to allow for the comparison of energy and water usage given building age, size, region, fuel type and occupancy. The building files will also be used in combination with an energy simulator-green house gas estimator to estimate the impact of upgrading the stock of multi-unit residential buildings in Canada. The database will be supplemented with additional buildings that CMHC will access in the course of other research projects.

NOTE: No. 01-142 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site. The title is: "Analysis of the Annual Energy and Water Consumption of Apartment Buildings in the CMHC HiSTAR database".

**STATUS :** Completed

**AVAILABILITY :** Research highlight is available

## FIRES & FIRE PREVENTION

### CLEANING UP YOUR HOUSE AFTER A FIRE

After a Fire is a consumer publication being prepared to help homeowners deal with fire damage in their homes. This publication will explain the issues to be considered to restore the home and to ensure a safe, healthy environment for the occupants. It is intended to be a brief publication targeted to the consumer, but it will also be useful to fire departments, restoration contractors, and insurance companies.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 2298 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### INVESTIGATION OF SMOKE CONTROL IN HIGH-RISES BY POSITIVE PRESSURE VENTILATION

A research project has been initiated to study the use of positive pressure ventilation (PPV) systems to contain and expel smoke from high-rise buildings during a fire emergency. PPV systems have been used in the U.S. in low-rise buildings. The system consists of a portable, high velocity fan which is used by the fire department to clear smoke from buildings in order to facilitate access to the fire and to aid in occupant evacuation. Preliminary studies have been conducted in multi-unit residential buildings but not in cold climates where stack effect may continue to dominate smoke movement. The research program is the result of a joint venture between CMHC, the City of Ottawa Fire Department and the Fire Laboratory of the Institute for Research in Construction of NRC. The ability of PPV to contain and clear smoke from exitways in high-rise buildings has been evaluated at the Fire Laboratory's full scale test building under both summer and winter conditions. Field testing of the ability of PPV systems to pressurize stairwells in high-rise buildings has also been performed. PPV may offer Fire Departments an effective, lower cost, life and property saving tool.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1983 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## FIRES & FIRE PREVENTION

### TECHNICAL TRANSFER ARTICLE - HIGH RISE FIRE SAFETY CONSIDERATIONS

The purpose of this project is to provide an article about and the requirements for design for fire safety in high rise buildings, which will be used for the purposes of continuing education for architects.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2377 0200008

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet on the web

**\*NEW\***

## HEATING AND VENTILATION

### ANALYTICAL MODEL OF EARTH TUBE VENTILATION SYSTEMS

The objectives of this project are: to determine the conditions under which exterior ground-buried ducts (earth tubes) can be used effectively under Canadian conditions; to determine heat and moisture gains and losses for these systems under Canadian conditions; to determine the potential contribution to improvement of energy and ventilation performance of Canadian housing; and to develop guidelines for builders regarding the application of these systems.

**CMHC Project Officer :** Chris Ives

**CIDN :** 2437 0200023

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### ASSESSING THE PARAMETERS FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS

This research project will determine the ventilation requirements for apartments. Equipment and systems will be evaluated in their ability to meet such requirements in the context of building design, occupancy type and recent experiences in the application of ventilation systems in multi-unit residential buildings. Design and installation recommendations will be created for use by building designers. Technology gaps (e.g.; the absence of appropriate equipment) will also be identified for the benefit of future research and development efforts.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2271 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ASSESSMENT AND ALTERNATIVE APPROACHES FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS

The purpose of this project is to conduct a literature review, needs assessment and alternative approaches for ventilation systems in multi-unit residential buildings.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2271 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## CAN/CSA F326-M91 (R1998), RESIDENTIAL MECHANICAL VENTILATION SYSTEMS

CMHC has been supporting the revision of Can/CSA F326-M91 (1998), Residential Mechanical Ventilation Systems, with a financial contribution to the Canadian Standards Association (CSA) to act as secretariat and through CMHC participation in the task group work of the Committee. There are some significant changes to be made to the standard. Some of the tasks may require help from outside consultants. The majority of the technical review should be complete by mid-2002.

**CMHC Project Officer :** Don Fugler

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2062 0200002

**STATUS :** Ongoing

**\*NEW\***

## CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS

The objective of this project is to undertake a field investigation of the ventilation and infiltration in a residential high-rise building. CMHC, in cooperation with the Institute of Research in Construction, will monitor indoor-outdoor air pressure regimes in a high-rise for a period of one year. Ventilation system performance will also be assessed. Pressure regime measurements, in conjunction with measured air leakage characteristics of selected assemblies, will be used to estimate real-time air movement across the building envelope. This information will add to the body of knowledge governing infiltration-ventilation regimes and resultant heat load calculations in buildings.

**CMHC Project Officer :** Duncan Hill

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 1934 0200005

**STATUS :** Ongoing

## DAWSON CITY DEMONSTRATION PROJECT - MONITORING

The objective of this project is to evaluate the state of the mechanical and monitoring system, conduct an on-site inspection in Dawson City and develop a proposal for monitoring and analyzing the system's performance. Two houses were monitored over the past two heating seasons and the operating data is being analyzed.

**CMHC Project Officer :** Mark Holzman

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 1676 0300005

**STATUS :** Ongoing

## EVALUATION OF AN APARTMENT HEAT RECOVERY VENTILATION SYSTEM

The objective of this project is to assess the ventilation performance of an innovative apartment heat recovery ventilation system.

**CMHC Project Officer :** Duncan Hill

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2271 0200002

**STATUS :** Ongoing

**\*NEW\***

## FIELD TESTING OF A POSITIVE PRESSURE VENTILATION DEVICE

A Positive Pressure Ventilation device, commonly used by fire departments for smoke control during fire emergencies, will be used to test the pressure and flow generating characteristics of the PPV fan system when used to pressurize a stairwell in a multi-unit residential building. The purposes of the test are twofold. First, the test will confirm the ability of the PPV equipment to generate sufficient pressures within the stairwell of an actual multi-unit residential building to prevent the proliferation of smoke into the stairwell from adjacent corridors. Second, the test will assess the ability of the PPV equipment to generate sufficient pressures to allow the equipment to be used for the purpose of determining air leakage characteristics of large buildings.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1983 0200003

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## FIELD TESTS OF VENTILATION SYSTEMS INSTALLED TO MEET THE 1993 OBC AND 1995 NBC

This research looked at 49 new houses which had ventilation systems installed to meet the requirements of the 1995 National Building Code (as adopted by various provinces) or the 1993 Ontario Building Code. None of the houses met all the code requirements. The lack of compliance in Ontario and the Maritimes was due to equipment selection and installation that varied from code requirements. The Prairie houses also showed very high levels of potential house depressurization, which could lead to dangerous backdrafting and spillage of combustion appliances. Results from the 49 houses were outlined in the CMHC Research Highlight: Technical Series, no. 00-106. Since the field tests, there have been several attempts to propose changes to the National Building Code ventilation requirements, to avoid the problems identified in the survey, and a consensus was achieved in the spring of 2001. More field research has been completed. Ten new Prairie houses were built to the newly drafted code clauses in the fall of 2001 and early winter of 2002. Testing showed that the new clauses were generally being successfully implemented by contractors. There were some areas of noncompliance but they were not safety related.

**CMHC Project Officer :** Don Fugler

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## NORTHERN HEATING AND VENTILATION SYSTEMS

This is a continuation of related CMHC research which is of particular need to the North. Adequate, appropriate and affordable means of ventilation and verification of manufacturers' claims need to be assessed using established CMHC methodology. Results will be critical in alleviating costly health and building damage due to lack of confirmed ventilation options. The report will be completed in 2002.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2420 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HEATING AND VENTILATION

### PERFORMANCE ASSESSMENT OF THE LEBRETON FLATS DISTRICT HEATING SYSTEM

The Lebreton Flats district heating system, installed 20 years ago, is one of few examples of low temperature district heating systems in North America. The availability of fuel consumption and maintenance records for the system allowed for an assessment of the performance of the system over the last 20 year period. Preliminary indications reveal that the plant provides space heating and hot water at a cost competitive with individual building systems but without the requisite building space. The distribution system was considered to be in good condition as minimal heat losses were noted. Recommendations regarding system performance, potential upgrades and future operation, maintenance needs and other ownership/management arrangements will be made in the final report.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2134 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### REDUCTION OF AIR INTAKE CONTAMINATION OF HIGH-RISE RESIDENTIAL BUILDINGS

In the study, entitled, 'Reduction of Air Intake Contamination of High-Rise Residential Buildings', buildings will be tested to determine optimal placement of air intake grilles for HVAC systems. The placement determination will be based on water flume tests and modeling of air movement around high-rise buildings given confounding factors such as the height and proximity of neighboring buildings. A literature survey of relevant research on air intake grille location and contamination potential will also be performed.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2305 0200009

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

### BEST PRACTICE GUIDE - FIRE AND SOUND ASSEMBLIES FOR MULTI-FAMILY BUILDINGS

This document, targeted at designers of multi-family buildings, will provide the latest information on CMHC research into fire and sound partitions, floors, flanking, plumbing noise, etc. Construction details for fire and sound assemblies will be detailed. The document is being produced in collaboration with the NRC/IRC.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 1804 0200003

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## BEST PRACTICE GUIDE - WOOD FRAME ENVELOPES IN THE COASTAL CLIMATE OF BRITISH COLUMBIA. REVISED EDITION

Building in B.C.'s coastal climate has special challenges -- and this revised guide is the most up-to-date, authoritative information available to help meet those challenges. This guide provides the most comprehensive technical information on how to build to withstand the conditions of B.C.'s coastal climate. The information includes behaviour of wood in construction, moisture source control strategies, heat flow mechanisms, typical envelope assembly characteristics, and materials for inclusion in specifications, quality assurance strategies, maintenance and renewal strategies and more than fifty-three state-of-the-art CAD details showing several air barrier strategies, all included on the companion CD-ROM. Endorsed by the Canadian Wood Council and the Building Envelope Research Consortium.

Ottawa: Canada Mortgage and Housing Corporation, 2001. 258 pages + CD-ROM

Order Number: 60959 \*\*Price: \$89.00 + GST and handling charges

NOTE : Aussi disponible en français sous le titre : Guide des règles de l'art : Enveloppe de bâtiments à ossature de bois dans le climat littoral de la Colombie-Britannique

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## BEST PRACTICE GUIDE FOR CURTAIN WALLS

The objective of this project is to develop a practical, advisory document for designers, architects and engineers, and manufacturers, related to curtain wall systems in housing applications. The curtain-wall is a well developed system in commercial applications but it requires special treatment when used in housing. The project will be conducted in partnership with curtain wall manufacturers and installers and their associations. This Guide will be produced as a joint publication through a collaborative project with Public Works Government Services Canada. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to curtain walls, construction details in AutoCAD format, outline specifications and additional sources of information and references. The anticipated release date for the product is October 2002.

**CMHC Project Officer :** Luis de Miguel

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2216 0200001

**STATUS :** Ongoing

## BEST PRACTICE GUIDE FOR EXTERIOR INSULATED FINISHED SYSTEMS (EIFS)

The objective of this project is to develop a practical, advisory document for designers, architects and engineers, and manufacturers, related to EIFS in residential applications. The project will be conducted in partnership with EIFS manufacturers and installers and their associations. This Guide will be produced as a joint publication through a collaborative project with the EIFS Council of Canada and the BC Wall and Ceiling Association. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to EIFS, construction details in AutoCAD format, outline specifications and additional sources of information and references. Anticipated release date is October 2002.

**CMHC Project Officer :** Luis de Miguel

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2047 0200001

**STATUS :** Ongoing

# HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

## BETTER BUILDING GUIDE TO INNOVATION IN THE DESIGN AND CONSTRUCTION OF HIGH-RISE RESIDENTIAL BUILDINGS

The objective of this project was to coordinate and edit the work relating to updating the "Better Building Guide to Innovation in the Design and Construction of High-Rise Residential Buildings" and to update the text, references and illustrations. The revised guide, titled Healthy High-rise Guide to Innovation is designed for architects and other building design professionals.

**STATUS :** Completed

**AVAILABILITY :** Product is available on the web

## BRITISH COLUMBIA HIGH-RISE ENVELOPE DETAILS STUDY

In recent years, there have been significant efforts to understand and resolve moisture ingress and deterioration problems associated with wood-framed, low-rise building construction. Currently, this problem is acute in some wood-frame condominiums in the Lower Mainland of British Columbia. There are indications that the high-rise stock may also be experiencing similar moisture problems. The objective of this project was to examine the files of a sample of thirty-five buildings to identify causal relationships that have resulted in building envelope problems and successes in non-combustible high-rise residential buildings in the coastal climate of lower mainland BC. This was done by correlating building envelope performance with sources of moisture, and features of design and construction of assemblies and details. The project did not estimate the extent of a potential problem. The project focused specifically on envelope details and envelope systems that have failed, rather than building failures. Envelope types and components under review included window/wall assemblies and light-gauge steel stud (back-up) wall assemblies with stucco, masonry and EIFS cladding systems. Project funding has been provided by Canada Mortgage and Housing Corporation in partnership with the Homeowner Protection Office, the City of Vancouver, the EIFS Council of Canada and Vancouver Condominium Services Ltd.

**CMHC Project Officer :** Mark Salerno, Silvio Plescia

**CIDN :** 2234 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## BUILDING RATING AND LABELING SYSTEMS

This project's objectives are to assess the changes that would have to be made to the 'LEED' rating system (owned by the US Green Building Council), to suit it to Canadian conditions; and to evaluate whether the existing Canadian 'Green Leaf' system (owned by ECD Canada), can readily be harmonized with LEED and whether it is likely to be able to function as a low-cost and simple complementary system.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2474 0200017

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA

The number and characteristics of condominiums in Canada are unknown. This project will review Statistics Canada data files to estimate the number of condominiums in Canada, their location, age, number of storeys and number of suites. This information will be used to supplement the CMHC Rental Market Survey in order to estimate the overall population of multi-unit residential buildings in Canada. This information will also be used to determine the data requirements for a database of multi-unit buildings that describes the physical characteristics and energy consumption patterns of this class of buildings. Such a database is necessary to establish energy retrofit guidelines for multi-unit residential buildings.

The review by STATSCAN has found that the number of condominium buildings in Canada may be determined through building permit information available from STATSCAN files since 1970. STATSCAN is in the process of compiling this information to estimate the condominium building population.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2277 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CONDITION SURVEY OF CONDOMINIUMS IN THE GREATER TORONTO AREA (GTA)

This project's objective is to carry out a condition survey of condominiums in the Greater Toronto Area. This project will be carried out in two phases. Phase 1 focuses primarily on data collection and development of research methodologies for examining topics related to both physical and social issues. Phase 2 focuses on conducting the surveys and completing the analysis of the state of repair of the buildings.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2161 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CONVERSION OF HIGH-RISE BUILDINGS TO RESIDENTIAL USE

The project will survey design and construction professionals and property managers of existing converted buildings across Canada to determine the extent and nature of technical problems which were encountered in the design and construction phases of the conversions; to determine the perception of property managers as to the concerns of the occupants; to determine the technical problems which have arisen as a result of these conversions; and to determine if there were any attempts to improve energy use performance or to introduce features to improve the sustainability of these buildings. Selected buildings would be documented as case studies in CMHC's Better Buildings/Innovative Buildings information series. The research report on this study is completed.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2242 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet on the web



## DEVELOPMENT OF A CEMENT STRESS-SKIN EPS-CORE BUILDING SYSTEM

This project's objective is to verify the performance of a composite wall in order to determine if it is safe for use in ancillary and residential buildings.

**CMHC Project Officer :** *Silvio Plescia*

**CIDN :** 2437 0200011

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR)

A database structure to house building characteristics, energy and water usage data for multi-unit residential buildings has been completed. The database, known as HiSTAR (High rise building Statistically Representative Database) is in MS ACCESS format. The database will be used to compile and analyze building energy and water data collected during CMHC's research projects which take consultants into high-rise residential buildings. The HiSTAR database will be used to generate fact sheets on energy and water use and will be used for the analysis of the potential impact of energy and water efficiency upgrades.

**STATUS :** Completed

**AVAILABILITY :** There will be no product for this project

## DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR) TASK 2: COLLECTION OF ADDITIONAL BUILDING FILES FOR THE HISTAR DATABASE

CMHC has commissioned a research project to gather information to characterize the energy and water consumption patterns in multi-unit residential buildings. This data will be used to supplement the data contained in the CMHC HiSTAR database. The HiSTAR database is used to baseline water and energy use in multi-unit residential buildings and is also used to evaluate the impact of building and occupancy characteristics and location on energy and water use.

**CMHC Project Officer :** *Duncan Hill*

**CIDN :** 2366 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## FIRE AND ACOUSTICAL PERFORMANCE OF FLOOR ASSEMBLIES - PHASE II

A continuation of an earlier project, this phase will be carried out over 4 years with a total budget of \$2.2 million. A dozen industry and government partners have formed a consortium with the National Research Council of Canada to complete testing of several types of assemblies for residential construction. Results will be incorporated in the National Building Code of Canada. Both full and small scale fire and sound testing will be carried out. A large database will be developed which designers and builders can use for reference. Particular attention will be given to assemblies likely to just obtain an STC 50 rating.

**CMHC Project Officer :** *Luis de Miguel*

**CIDN :** 2375 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS

Investigations of previously retrofitted solid masonry walls have been performed to determine the impact that the interior application of insulation has on the durability of the walls. The findings of the investigations will be published as case studies. Case studies will include a 120 year old solid masonry building in Montreal that was insulated 15 years ago by the application of spray applied polyurethane insulation on the interior of the walls, a 50 year old solid masonry office building in Ottawa that was insulated on the interior 8 years ago and several 1900's vintage apartment buildings in the Ottawa area. Preliminary indications are that the interior application of insulation has not adversely affected the durability of the masonry walls of the case study buildings but further investigation will be required to confirm that this conclusion generally holds true for other buildings.

**CMHC Project Officer :** Duncan Hill

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL ASSEMBLIES - COQUITLAM, BC

Wood framed buildings in the Vancouver area have experienced excessive moisture damage to the sheathing boards and wood framing over the past decade. This applied research project, funded by Canada Mortgage and Housing Corporation in partnership with Polygon Homes Ltd., involves the development of a building envelope diagnostic tool, specifically, an in-situ monitoring method to diagnose causes of moisture problems in low-rise wood-framed construction. This method is important to residential building owners as it can be used to develop cost effective remedial repair recommendations and to promote better design and construction guidelines for new buildings. This project's objective is to monitor the performance of the exterior wall assemblies of two, 46 unit four-storey buildings in Coquitlam, BC. Monitoring will be carried out for one full year, capturing the wall response to the range of climate loading conditions. Exterior walls, including interior living spaces as well as interstitial wall areas, will be monitored for temperature, relative humidity, wood moisture content and air pressure differentials. A weather station, mounted on the roof of one building will capture the local weather conditions: air temperature and relative humidity, wind speed and direction and rainfall. Monitoring of the buildings began in January 2001. Data collection will continue until the spring 2002. Project completion is expected during the summer of 2002.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2254 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## INTEGRATED DESIGN CHARRETTE IN TORONTO FOR ARCHITECTS AND BUILDING PROFESSIONALS

This project's objective is to undertake and complete the organizational and reporting work to plan, coordinate and carry out activities related to an Integrated Design Charrette in Toronto for architects and building professionals.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2474 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Research highlight is not yet available

**\*NEW\***

## LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING

This project will describe load profiling work underway in Metro Toronto Housing Corporation multi-unit residential buildings. The project will characterize thermal, electrical power and water requirements in the apartment buildings and will also identify technical issues encountered in load monitoring and data interpretation. This project is being used as a pilot project to identify the factors that will have to be considered in a larger project being planned by CMHC and Natural Resources Canada to assess the energy and water load profiles in low and high-rise housing.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2201 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS

The purpose of this project is to develop knowledge to assess the impact of various wall design and indoor-outdoor environmental conditions on the durability and energy efficiency of new and retrofitted high-rise residential and commercial building systems. The hyglRC heat, air and moisture model developed by the Institute for Research in Construction is being used to model common wall systems. Retrofits to improve the airtightness and insulation levels in the walls were developed and are being applied to the basic wall systems. The hyglRC model will simulate heat, air and moisture conditions within the retrofitted walls to determine how the retrofits affect the durability of the wall system. This information will be used as a means to confirm the integrity of several specific retrofit measures developed for high-rise wall structures before they are recommended to the building industry.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1934 0200003

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## MODIFY AND UPGRADE WALLDRY COMPUTER PROGRAM

This project's objective is to modify and upgrade WALLDRY, a computer program developed by CMHC, which models the flows of moisture, heat and air through wall assemblies.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2505 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***



## MONITORING INNOVATIVE MECHANICAL AND ELECTRICAL SYSTEMS

The innovative mechanical and electrical energy producing systems in a multi-unit residential buildings project in Toronto were monitored and assessed to determine their economic viability. The project involved the assessment of the buildings cogeneration, space heating, absorption chilling, domestic hot water and ventilation systems and a review of natural gas and electricity use. The cost of energy provided to the building by the cogeneration system in terms of fuel consumption, maintenance expenditures, avoided electrical use and other considerations was determined. An inspection of the individual space conditioning systems within the suites was also performed. The findings of the investigation showed that the operation costs (fuel use, maintenance and repair) of the cogeneration system was not economically viable. Key findings include the observation that the system was not making full use of the heat generated by the cogeneration systems. The report estimated that even if all of the heat was recovered from the cogeneration system, the benefit of the system to the building's owners would be marginal. Given that the building embodies some of the most advanced technologies that allow for energy efficiency, cascading and recovery, operation costs should have been low relative to conventional buildings.

CMHC coordinated a meeting of the project developer, engineering design team, cogeneration system manufacturer, utility representative and industry experts and stakeholders to review the situation in the building and to determine whether or not the performance of the building systems could be improved. The outcome of the meeting was that a review of the utility meters and billing history should be undertaken to confirm that the basic information being used to assess the performance of the building is correct. CMHC is working with Ontario Hydro Energy and Admic Controls to develop a metering review plan and evaluation.

**CMHC Project Officer :** Duncan Hill

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 1260 0800001

**STATUS :** Ongoing

## PERFORMANCE OF AN INNOVATIVE HIGH-RISE RESIDENTIAL BUILDING

CMHC is monitoring the performance of a recently constructed multi-unit residential building that implemented many of the most innovative building technologies developed to date. The building features a durable, airtight and highly insulated building envelope, combination space and domestic hot water heating systems in each apartment, individual heat recovery ventilators in each apartment, thermally isolated balcony slabs, a heat recovery system for corridor ventilation and garbage room odour containment. The monitoring project will assess the performance of the building envelope, the space and domestic hot water heating systems and the efficiency and effectiveness of the ventilation systems. Air movement throughout the building will also be assessed. To date, the building has been air tested to assess its air leakage characteristics. The tests showed that the building is one of the most airtight multi-unit residential buildings constructed in Canada. Energy and water monitoring has shown that the building consumes approximately one half of the average energy and water used in conventional apartment buildings.

**CMHC Project Officer :** Duncan Hill

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2147 0200001

**STATUS :** Ongoing

**\*NEW\***

## REPAIR AND RETROFIT CASE STUDIES OF THE LOFTS CORTICELLI COMPLEX

A field project to review the condition of the solid masonry walls of a historic building in Montréal has been completed. The building, originally constructed in the 1800's, was converted to residential use in 1986. As a part of the renovation, the interior of the solid masonry brick walls was insulated with spray applied polyurethane foam and fibreglass batt insulation. As this type of insulation retrofit was thought to be responsible for the deterioration of solid masonry walls, CMHC initiated a project to assess the condition of the building envelope and all of the elements. The field survey found that the walls, after 14-15 years of service, were in good condition. No conditions or symptoms were found that would lead to the conclusion that the application of the spray applied polyurethane foam and other finishing materials had, in anyway, undermined the integrity of the wall system. This finding is important as many older buildings in the urban areas of Canada are being renovated to residential use and exterior insulation retrofits are not possible for heritage or aesthetic reasons. While the finding of this study is specific to this one building, it appears that interior insulation wall retrofits may be possible as long as steps are taken to prevent the intrusion of moisture and air leakage from both interior and exterior sources into the wall assembly. Susceptible wall members, such as embedded wood structural members should be protected as well. CMHC will perform additional case studies of retrofitted solid masonry walls to provide a better understanding of the strengths and weaknesses of this form of renovation.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1782 0300020

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## REVISIONS TO BRICK VENEER STEEL STUD BEST PRACTICE GUIDE

The objective of this project is to produce a revised version of CMHC's Brick Veneer Steel Stud Best Practice Guide.

**CMHC Project Officer :** Luis de Miguel

**CIDN :** 2378 0200003

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## SEISMIC PERFORMANCE OF RAINSCREEN STUCCO

As an integral phase of a larger 'Earthquake 99 Project' (a project to develop practical cost-effective methods to substantially reduce heavy earthquake damage to residential wood frame construction) Canada Mortgage and Housing Corporation in partnership with the Homeowner Protection Office and British Columbia Housing Management Commission contracted with the University of British Columbia and TBG Seismic Consultants to research the seismic performance of rainscreen stucco exterior cladding systems for residential wood frame construction in BC. The primary objective of this research is a comparative earthquake performance evaluation of rainscreen and non-rainscreen stucco systems. The secondary research objective is the development of refinements to the design of rainscreen stucco systems to improve performance when subjected to seismic loading. This comprehensive study includes an extensive test series to determine the strength of different stucco types, static cyclic tests of single wall specimens, the analytical modeling of wall systems with stucco, and the dynamic testing of a full-scale house incorporating a stucco wall system. The completion of this project is expected by end of summer 2002.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2480 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

### TECHNOLOGY ROAD MAP FOR INTELLIGENT BUILDING TECHNOLOGIES

The objective of this project is to develop a road map for intelligent building technologies, considering the potential technological, societal and other developments that will affect the industry within the next five years.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2388 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOME OWNERSHIP

### CONDOMINIUM BUYER'S GUIDE

This guide is being developed to assist buyers in choosing a condominium which meets their personal and financial needs. The guide will provide buyers with an overview of the operation of different condominiums and important questions to address when choosing a condominium to meet the lifestyle and financial needs of the buyer. In addition, the guide will provide guidelines on evaluating the financial and physical status of an existing condominium. Information on evaluating the physical condition of the individual unit, the condominium building and grounds, and the financial status of the condominium will also be covered. Contact information for acquiring additional information and assistance will be included.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2514 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## HOUSE CONSTRUCTION

### ALTERNATIVE WALL SYSTEMS FOR LOW-RISE RESIDENTIAL CONSTRUCTION

The purpose of this study was to research ten alternative wall systems for low-rise housing in use today. These systems included insulated concrete forms, straw bale, structural insulated panels, stack wall, concrete block, post and beam, log, earth construction, manufactured wood, and lightweight steel. The results of this study will be beneficial to those in the industry to help them make better informed decisions on choices between alternative systems. This study investigated the differences, benefits and limitations of the various building systems which are currently in use as compared to the typical wood-frame, stick-built construction of low-rise housing. It considered the benefits and drawbacks of the various systems. The study examined a number of the factors to be considered by a builder or homeowner to help them understand the differences between the available system choices so they may evaluate and select systems appropriate to their clients, house designs, trade practices and skills, and regions. The study included reviews by industry representatives. The final report should be available by July 2002.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2119 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## BUILDING ENVELOPE SOLUTIONS - THEORY AND PRACTICE

This was a partnership project between the Canadian Home Builder's Association of British Columbia (CHBA/BC), the Homeowner Protection Office (HPO) of B.C. and CMHC. The purpose of the project, previously called "Builders ToolBox", was to develop materials which would be used to train general contractors and subtrades in building construction practices that would enable them to construct highly durable building envelopes for new residential wood-frame buildings located in the lower mainland of British Columbia and Vancouver Island and to restore and upgrade the envelopes of existing buildings. The end product is a manual divided into 11 modules: Introduction; Building Science; Results of Survey of Buildings in the Lower Mainland; Condensation Control in Wall Assemblies; Rain Penetration Control in Wall Assemblies; Sheathing, Sheathing Membranes, Claddings and Flashings; Windows and Doors; Roofs, Decks, Walkways and Balconies; New Construction of the Building Envelope; Restoration of the Building Envelope; and Regulatory Requirements and Standards. The material can be tailored to meet the various needs of the residential construction industry in B.C. The course is currently being offered by the British Columbia Institute of Technology.

**STATUS :** Completed

**AVAILABILITY :** Seminar/training is available

## COMPARING THE PERFORMANCE OF TWO-COAT VS THREE-COAT STUCCO

CMHC through its Prairie and Northwest Territories Business Service Centre in Calgary is supporting this Alberta Housing Industry Technical Committee (AHITC) research project.. The research will use laboratory and field testing to compare the performance of two coat stucco commonly used in the Prairies and standard three coat stucco. If they perform similarly, building code changes may be recommended. The effects of stucco additives and mixtures will also be examined. The contractor has completed the review of test procedures and has undertaken the laboratory work. Two coat stucco did not have the same strength in laboratory testing as code-required three coat. Field tests are being organized to see if two coat stucco applied to actual houses is performing as well as three coat.

**CMHC Project Officer :** Don Fugler, Colin Crumb

**CIDN :** 2399 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## DEVELOPMENT OF AN INSTRUCTOR'S GUIDE AND AN ACCOMPANYING PRESENTATION FOR RESIDENTIAL GUIDE TO EARTHQUAKE RESISTANCE

The objective of this project was to develop a course to advocate the importance of, and to convey knowledge on making houses more resistant to earthquakes. There will be two courses developed. The first one, which was developed in partnership with the British Columbia Institute of Technology (BCIT), is approximately 18-24 hours in length and will be targeted to designers, builders and renovators. It covers information on construction techniques to better prepare housing to withstand an earthquake. The second course, which will be developed in-house by CMHC staff from the long course, will be approximately 6 hours and targeted to a general audience of consumers. It will address consumers' concerns regarding the durability of their housing during disasters. The development of the industry course is completed and is to be piloted through BCIT this Fall and Winter, 2002. Following the pilot any required modifications will be made to the course material.

**CMHC Project Officer :** Darrel Smith, Mark Salerno

**CIDN :** 2517 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Seminar/training is available

## FEASIBILITY OF DEVELOPING A BUILDING CANADA PROGRAM

The purpose of this project by EnerQuality Corporation is to examine the feasibility of developing a Building Canada program similar to the Building America model. To be effective, the Canadian program needs to be of interest to Canadian builders and recognize the different environment by responding to their real needs, i.e., reducing construction costs, customer callbacks, warranty claims, construction time, and construction waste, while at the same time improving the energy efficiency of their new houses. The program will result in little or no additional cost for the builder and where ever possible a reduction in costs. This study is a necessary first step to determine if a Building Canada program is viable and could be established in Canada. It will draw from the experience of the Building America program as well as the results achieved in a pilot of this program with two large Canadian builders. This project is being managed by EnerQuality Corporation on behalf of a consortium of partners including: CMHC, Enbridge Consumers Gas, Union Gas, Owens Corning, Natural Resources Canada, and the National Research Council (through its Industrial Research Assistance Program). Once this initial program design phase has been completed, and if found feasible, the program will be launched and expanded as part of subsequent phases.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2387 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## FEASIBILITY STUDY ON THE DEVELOPMENT OF A COMMISSIONING GUIDE FOR NEW HOUSES

The purpose of this project was to assess the importance and determine the feasibility of developing a commissioning guide for builders and buyers of new houses. The research indicated that generally home builders do not currently carry out a whole house commissioning and do not have a protocol to do so. However with houses becoming more complex, there is greater need to have a competent person investigate the whole house and all its systems to ensure they are installed and functioning as originally designed before delivery to the buyer. To be effective and useful, the commissioning guide must be simple to use and yet comprehensive. It must not add significantly to the cost of the house. Commissioning should not be a duplication of services already in place. The guide should include a review of the installation and operation of all major components and systems of the house. The study found that the benefits of the house commissioning process are that:

- houses perform better;
- homeowners are assured the house is built as expected according to the plans and specifications and the components and systems have been installed and are functioning properly;
- homeowners are better informed about the systems in their houses and how they work (resulting in less call backs for contractors); and
- potential problems are identified before damage occurs (also resulting in less call backs for contractors and reduced costs for warranty programs).

The study identified a need and found interest by clients and stakeholders in the development of a commissioning guide. As a result, CMHC is considering the development of a commissioning guide.

*Prepared by Buchan, Lawton, Parent Ltd. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Darrel Smith. Ottawa: Buchan, Lawton, Parent Ltd., 2001. ca. 100 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Available on an interlibrary loan basis from:  
Canadian Housing Information Centre



## HOUSE CONSTRUCTION

### RESEARCH ON SOLUTIONS TO PYRITE-RELATED BACKFILL EXPANSION PROBLEMS

This study will draw up an inventory of the problems associated with the reactions of the pyrite (iron sulphide) contained in the backfill stone used under slabs in residential properties. Two hundred houses inventoried in three Montréal South-Shore municipalities will be visited under the CTQ-M200 protocol developed as part of the work of the Quebec technical committee on pyrite-related problems. The results of the study will identify possible causes and potential affordable solutions. The objective is to provide the industry with a more global vision of this new situation.

**CMHC Project Officer :** *Jacqueline Meunier-Bureau*

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### WOOD USAGE IN STRAW BALE HOUSE CONSTRUCTION

This is another in a series of small projects assessing the acceptability of straw bale walls for housing. The contractor totaled the wood used during the construction of his load-bearing, straw bale building, and then compared it to a simulated, conventional building of the same size and design. In this simple design, without interior partitions, the straw building used over 45% less wood than the corresponding conventional house. This study uses the straw bale building type that is most likely to show an advantage. For straw bale houses using post and beam construction, or having significant interior framing, wood savings would be much reduced.

*Research Contractor: Scott Pegg, Eco-Way Living Group Inc. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2002. (Research Highlights; Technical Series; 02-116) 2 pages*

NOTE : Aussi disponible en français sous le titre : L'utilisation de bois dans la construction de maisons en ballots de paille

**STATUS :** Completed

**AVAILABILITY :** Research highlight is available

## HOUSING DESIGN

### DESIGN MULTIPLE-UNIT CHUM'S AND MODULAR HOUSE PACKAGES FOR URBAN AND SUBURBAN, REMOTE AND NORTHERN COMMUNITIES

The purpose of this project is to support the preparation of design drawings, construction specifications and cost estimates for several Multi-Unit CHUM's (Containerized Heat and Utilities Modules), and for matching Modular House Designs that would integrate with these CHUM's, specifically for the suburban and rural, remote and northern communities contemplated. A CHUM provides on-site utility services for housing. The project is about 85% complete - a draft version of a design manual has been produced in both a printed format and as a CD-ROM. The project has been delayed in part due to difficulties in establishing candidate sites for demonstration and/or commercial application. The manufactured housing industry has been a key participant/supporter of this project.

**CMHC Project Officer :** *Chris Ives*

**CIDN :** 2407 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## FLEXHOUSING FEATURES IN A BENCHMARK HOUSE DESIGN

This project's objective is to produce costing information which will show the cost of including FlexHousing features in a benchmark house design.

**CMHC Project Officer :** Thomas Parker

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2512 0200001

**STATUS :** Ongoing

**\*NEW\***

## MONTREAL: A GREAT TRADITION OF MEDIUM-DENSITY HOUSING

This project aims to highlight the adaptation processes of housing and building types throughout the various phases of the evolution of "plex" formulas (duplex, triplex, fourplex, fiveplex ...) in Montreal over two construction cycles between 1866 and 1900.

**CMHC Project Officer :** Brian Eames

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 1455 0200001

**STATUS :** Ongoing

## QUANTIFYING UNIVERSAL DESIGN: A PROGRAM FOR IMPLEMENTATION

This research project was to identify methods to acquire the pragmatic information needed to further the principles of universal design. These principles of flexibility, ease of use, etc. were validated with some modifications. As in previous research, the concepts inherent in universal design were seen as critical, appropriate and useful to create more inclusive environments.

The methodology for this project featured a literature search, the preparation of a discussion paper, and a meeting with people with diverse expertise discussing questions related to develop methods for collecting and organizing information to promote universal design.

The literature review found that most current dimensional information fails to meet criteria developed from a universal design perspective. In particular, people with disabilities, people 65 years and older, children, and pregnant women were under-represented in the samples and in the types of dimensional information available. As well, the information that was available was usually presented as separate from the 'general population' rather than integrated into inclusive databases.

The final report includes a summary of the meeting discussions with a description of a proposed methodology, discussion of resources needed to implement such research projects, and the organization of a database. The appendices include a glossary, the background discussion paper with a literature review synthesis, and the list of consultants.

*A report of a workshop, October 13-14, 2001, Winnipeg, Manitoba. Researched and prepared by F. G. Consortium, Gail Finkel & Yhetta Gold in collaboration with Betty Havens, Juliette Cooper. Ottawa: Canada Mortgage and Housing Corporation, 2001. (External Research Program Research Report) 54 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## BONHEUR DU BON AIR - ALONG WITH THE DRAFTING OF AN ACCOMPANYING BOOKLET

This project's objective is the production of a CD entitled "Le bonheur du bon air", along with the drafting of an accompanying booklet.

**CMHC Project Officer :** Jean Rattelle  
**Division :** Policy and Research Division  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2463 0200002  
**STATUS :** Ongoing  
**\*NEW\***

## DEPRESSURIZATION RESISTANCE TESTING

There are several projects under this title. One project is supporting the development of testing procedures to be used in wood burning appliance standards to determine the depressurization resistance of various appliances. If useful, the technique or a variation of it may be integrated into appliance standards for other fuels (e.g. gas, oil). Another project is surveying 100 appliances in Peterborough and Winnipeg to see if theoretically "spillage-resistant" appliances can operate under significant house depressurization. A third project will support development of the test procedures.

**CMHC Project Officer :** Don Fugler  
**Division :** Policy and Research Division  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2492 0200002  
**STATUS :** Ongoing

## DEVELOPING MATERIAL EMISSIONS STANDARDS FOR ASTM APPROVAL

This project is providing support for the development of two ASTM standards on materials emissions. One of these standards will be for evaluating emission factors from "Caulk and Sealant Products," and the other will be for "Spray-Applied Polyurethane Cellular Plastic Thermal Insulation." The standards are nearing the completion stage. With changes resulting from a Spring 2001 ballot, the standards will be resubmitted for balloting in late Spring 2002.

**CMHC Project Officer :** Ken Ruest  
**Division :** Policy and Research Division  
**AVAILABILITY :** Product is not yet available

**CIDN :** 1244 0201011  
**STATUS :** Ongoing  
**\*NEW\***

## HEALTHY INDOOR ENVIRONMENTS PHASE 2: CONSULTATION PROCESS

This is the second phase of the project "Towards the Use of Voluntary Initiatives for Achieving Healthy Indoor Environments in Canada" which was a 1998-99 partnership project led by Pollution Probe Foundation in which CMHC participated. Recommendations from the initial report include the development of a comprehensive multi-stakeholder strategy to address the Canadian indoor environment issue. Phase 2 work, also led by Pollution Probe in partnership with a number of government and industry stakeholders, involved the hosting of three regional consultations (Toronto, November 2000; Halifax, January 2001; and Vancouver, March 2001) and a web based database discussion forum. Phase 2 developed a vision of what is possible in the field of healthy indoor environments, a strategy to achieve it, and began establishing multi-stakeholder commitment to realize that strategy. The project has been completed and the final report "Healthy Indoors: Achieving Healthy Indoor Environments in Canada" is available by loan from CMHC's Canadian Housing Information Centre (CHIC) and copies are being distributed by the Pollution Probe Foundation.

**STATUS :** Completed **AVAILABILITY :** Final report is published and distributed by Pollution Probe Foundation.

## INDOOR AIR POLLUTION FROM ATTACHED GARAGES

CMHC contributed to a Health Canada/Environment Canada project investigating the infiltration of garage-based pollutants into houses. Twenty-five Ottawa houses have been tested to determine the leakage area between the house and the attached garage. Pressure differentials were recorded and pressure testing was repeated during the winter months. Further field testing took place in the winter of 1998/99, including modeling of the IAQ implications and monitoring of pollutant entry when the garage is occupied by a "calibrated" car. Modelling of results showed that one proposed solution, garage exhaust fans, could be effective in some houses but near useless in others. The research is being published in various peer-reviewed publications during 2002. CMHC released a Research Highlight (Technical Series 01-122) on the airtightness testing aspect of the project in summer 2001. Additional testing is planned to start in 2002.

**CMHC Project Officer :** Don Fugler

**CIDN :** 1910 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## LET'S CLEAR THE AIR INDOOR AIR QUALITY (IAQ) INITIATIVE

This initiative delivers information on indoor air quality in the home to targeted audiences, the end result of which will benefit Canadian homeowners and occupants. Basic information to increase awareness and appreciation of indoor air problems is through the one-day Let's Clear the Air seminar for housing and health professionals. A second day consisting of a site visit to a home with an IAQ expert demonstrates the IAQ investigation method. Qualified individuals can proceed to the Residential Indoor Air Quality Investigator Training Program. Individuals who complete the training program acquire the skills to inspect homes for IAQ problems and to provide informed advice to homeowners on how to correct these problems. As a private business, they offer their professional services to the public for a fee. Individuals interested in the program can contact the training coordinator (e-mail: [IAQprogram@aol.com](mailto:IAQprogram@aol.com), telephone 613 253-8372) for admission requirements and application forms. Two dozen individuals have received their completion diploma and fifty are in the field training phase. For referral purposes, a list of diploma graduates is available from CMHC offices.

**CMHC Project Officer :** Virginia Salares

**CIDN :** 1623 0300017

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Seminar/training is available

## POUSSIÈRE DOMESTIQUE : UN OUTIL EFFICACE ET ABORDABLE D'ÉVALUATION DE SALUBRITÉ MICROBIENNE RÉSIDENTIELLE : RAPPORT FINAL

In the Greater Montréal area, in 2000 and 2001, the microbial content of the dust of 68 "healthy" homes with no water damage and no occupant health symptoms was compared to that of 145 "unhealthy" homes with major water damage. The average mould counts are seven times higher than in the unhealthy homes. The distribution of mould in healthy homes, with a predominance of genera like *Cladosporium* and *Alternaria*, differs from that in unhealthy homes, with genera such as *Penicillium* and *Aspergillus*. These results show that the mould content of the dust in a home is an indicator of its degree of microbial health.

Prepared by Marie-France Pinard, Laboratoire MICROVITAL. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Ken Ruest. Ottawa: CMHC, 2002. (External Research Program) ca. 29 pages

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



## PRINCE EDWARD ISLAND BIRTH COHORT STUDY OF MOLD IN HOMES

This joint study between CMHC, Carleton University, Health Canada and others is examining a large sample of homes in Prince Edward Island to determine the biological exposure, house performance parameters and energy use characteristics of a statistically-representative set of houses occupied by newborn babies. Part of the study will follow the health of these babies to determine the degree to which damp and moldy houses result in increased infant health problems. A total of 291 houses have been tested at the end of the fifth year of the project. An additional 60 houses are to be tested during winter 2002-2003. Due to the long term nature of this research, research reports have not as yet been issued.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 1618 0300001- 2

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RENOVATING THE HOME FOR ASTHMA: AN INTERVENTION STUDY

The purpose of this project is to study the relationship between air quality in housing and respiratory health. Health Canada, Carleton University and Natural Resources Canada are partners and are represented in the project advisory committee. Funding is from CMHC, with contribution from the Program for Energy Research and Development (PERD). The methodology is similar to that of a completed pilot project which studied the effect of renovating the homes for indoor air quality on the asthmatic condition of the occupants. This project will look at 20 case studies of moldy houses selected from different parts of the country and renovated by their owners. Remediation of the houses will incorporate measures to improve their energy efficiency. The output will be a research report that will be of interest to builders and renovators, the general public, the asthmatic population, researchers and physicians. The study should be complete by late 2003.

**CMHC Project Officer :** Virginia Salares

**CIDN :** 2157 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY

CMHC is participating in an Industrial Research Chair in Health and Indoor Air Quality at Carleton University. The principal funding for this Chair is being provided by the Natural Sciences and Engineering Research Council (NSERC), Paracel Laboratories, Morrison Hershfield Ltd., Health Canada, Kingston General Hospital, Carleton University and CMHC. The Chair, in collaboration with its partners, will develop more rapid and cost effective methods for measuring the types and amount of mold in buildings and exposures of the occupants, construct a database of cultures of molds found in moisture troubled buildings, prepare purified extracts of the molds for allergy diagnostic tests and undertake studies of the effects of these molds on lung cells. The output from this Chair would have far-reaching benefits for the general population in the clinical diagnosis of mold allergy and the mitigation of mold contaminated buildings. A five year research program of the Chair is underway.

**CMHC Project Officer :** Virginia Salares

**CIDN :** 2269 0600

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## FEASIBILITY OF UTILIZING A PORTABLE HOUSING PLANT FOR SINGLE FAMILY DETACHED CONSTRUCTION

This External Research project is studying the economic feasibility of using an automated, highly mobile plant to produce houses that are from 90-95% complete when they leave the plant. The plant would be erected in the subdivision where the houses are to be built, and once the construction program is complete, the plant would be dismantled and shipped to the next locale. An interim report has been received (Fall 2001), and the final report is expected in the second quarter of 2002.

**CMHC Project Officer :** *Chris Ives*

**CIDN :** 2305 0200004

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## MANUFACTURED HOME DESIGN AND LAND LEASE COMMUNITY PLANNING

The purpose of this project is to explore various innovations in land use, infrastructure and unit design in manufactured home land lease communities across Canada. The intention is to demonstrate that not only can land lease communities be leaders in infrastructure innovation as well as providers of high quality affordable housing, but that in any community when these issues are explored simultaneously, that savings from one area can offset extra costs in another. The first of several demonstrations which will make up this project will undertake and complete the design of a Tee or L shaped 'foldable' manufactured home with improved heat storage and thermal envelope and its related site planning, as well as initial planning and infrastructure investigations for future phases of a land lease community in Nova Scotia. Other projects will investigate two storey designs and the use of containerized infrastructure modules.

**CMHC Project Officer :** *Doug Pollard*

**CIDN :** 2444 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## MANUFACTURED HOUSING CONSULTANTS' TRAINING PROGRAM - PHASE II

This was a partnership project between the Canadian Manufactured Housing Institute (CMHI), the Provincial Manufactured Housing Associations of B.C., Alberta and Saskatchewan, Ontario and Atlantic Canada, and CMHC. The purpose of this project was to build on and improve the two day Manufactured Housing Consultants' Training Program and to ready it for ongoing delivery at the provincial level. The training program, which was developed under Phase I, covers a broad overview of the many aspects of the manufactured housing sales function. Topics include product and process knowledge, such as factory construction, zoning regulations, siting options, and transportation and installation procedures. Under Phase II, the participant's manual and the trainer's material were revised to incorporate improvements resulting from the pilot program, and new additional information such as: information for modular retailers, participants workbook, and marketing and promotional materials. These changes were necessary to ensure a high level of quality, effectiveness and consistency of the course delivery by the various provincial industry associations. This work has been completed and a number of courses have been offered with outstanding success. The program is being delivered through a partnership arrangement with provincial associations/organizations and is open to all representatives of the manufactured housing industry in Canada.

**STATUS :** Completed

**AVAILABILITY :** Seminar/training is available

### CLEANING UP YOUR HOUSE AFTER A FLOOD AND CLEAN-UP PROCEDURES FOR MOLD IN HOUSES

Two CMHC publications, "Cleaning Up Your House After a Flood" and "Clean-up Procedures for Mold in Houses", are undergoing revision. These documents have been widely used since 1993. The revision will incorporate the most up-to-date information on dealing with mold and provide steps for homeowners to follow in assessing and fixing the problem.

**CMHC Project Officer :** Virginia Salares

**CIDN :** 2447 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### DEFINING PERFORMANCE OF WATER RESISTIVE BARRIERS

Water Resistive Barriers (WRB), also known as sheathing membranes, fulfill many critical functions in the building envelope, but the means to evaluate their field performance has not been adequately developed. This is a pilot project that aims to define the key elements affecting performance of WRB in stucco systems with a view to pursuing the following objectives: 1. Develop adequate experimental characterization of likely WRB field performance. 2. Define WRB characteristics needed for input into advanced Heat Air and Moisture (HAM) models. 3. Examine probable long-term performance of WRB and in particular, study the effect of chemical leaching from stucco products and wood based materials. 4. Compare the results of wetting and drying predicted by advanced HAM models with experimental results.

It is expected that helping manufacturers and users of breather-type moisture barriers define the performance of such materials in both conventional and rainscreen walls will lead to better differentiation between applications of different WRB products as well as in development of new products.

The External Moisture Control (EMC) Consortia, comprising Canada Mortgage and Housing Corporation, the Homeowner Protection Office, E.I. Dupont de Nemours Inc., Fortifiber Corporation, and HAL Industries are funding this project. The study is being performed at Concordia University. Completion of the project is expected by spring 2003.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2490 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### GUIDELINES FOR MOISTURE MANAGEMENT IN EXTERIOR WALL SYSTEMS

CMHC is providing financial and technical support to NRC/IRC to develop guidelines for moisture management strategies for exterior wall systems. The guidelines will address user requirements for long-term performance and durability of wall systems for the wide range of climate zones across North America.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2199 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## GUIDELINES FOR ON-SITE MEASUREMENT OF MOISTURE IN WOOD BUILDING MATERIALS

Builders, inspectors and engineers undertaking moisture measurements on site in many instances do not possess the necessary background for using or interpreting moisture meter readings from wood and wood-based products. Because judgement is also needed in their interpretation, this document has been prepared to provide both detailed instructions and background information to assist persons involved in these endeavours. The objective of this report is to assist those not fully informed in wood moisture measurement technology and to provide general guidance with respect to measuring wood moisture content in field conditions. The document outlines the types of available moisture meters, a process of how to take moisture readings, where to take moisture readings and how the moisture readings are corrected for temperature and wood species. In addition, the document will provide a general discussion about steps builders and designers can take to minimize construction complications due to moisture.

*Prepared by Forintek Canada Corp. Sponsored by Canada Mortgage and Housing Corporation and Canadian Wood Council. Ottawa: CMHC, c2001. 1 CD-ROM*

**STATUS :** Completed CD-ROM

**AVAILABILITY :** Canadian Housing Information Centre

## IMPROVEMENTS TO THE MOISTURE PERFORMANCE OF PRESERVED WOOD FOUNDATIONS

Previous work by Forintek, the wood industry research agency, has established that the bottom plate of preserved wood foundation walls is very often over 20% moisture content. The wood preservatives generally prevent this relatively high moisture content from causing any degradation in structural strength. However, it is possible that the wet plate will transfer moisture to the insulated cavity above. This may lead to the development of mold in the wall cavity. The objective of this research project was to retrofit a mold troubled Ottawa area preserved wood foundation to validate a practice for reducing a high moisture level and mold within the PWF cavity. The demonstration house has been modified by using fans to ventilate the lower part of the wall cavities. Wood moisture levels were monitored through 2001. The remediation was successful at preventing noticeable levels of mold in the cavities or the house air during the monitoring period. Data analysis continues to quantify the actual reductions in wood moisture levels.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2419 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL SYSTEMS - VANCOUVER, BC

Wood framed buildings in the lower mainland of British Columbia have experienced excessive moisture damage to both sheathings and framing materials. In recent years, with the adoption of Best Practice principles throughout the construction industry (by builders and developers, design professionals and various construction trades) coupled with regulatory amendments to the City of Vancouver building by-laws, a new generation of exterior wall assemblies incorporating a 'rainscreen' moisture management strategy has been constructed. How effective were these walls at managing the exterior moisture loads? The objective of this applied research project, funded by Canada Mortgage and Housing Corporation, is to monitor, assess and document the performance of a residential low-rise four storey, wood-framed building which incorporates rainscreen design technology, and to analyze data to determine the effectiveness of wood frame rainscreen wall

## MOISTURE AND MOLD

assemblies at managing exterior moisture loads. Monitoring of interior, exterior and interstitial wall areas will include temperature, relative humidity, wood moisture content and air pressure differentials. A weather station mounted on the roof of the building will capture the local weather conditions: air temperature and relative humidity, wind speed and direction and rainfall. Monitoring will be carried out for one full year, capturing the wall response to the range of climate loading conditions. Project completion is expected in the spring of 2003.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2254 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## MOLD CLEANUP PROCEDURES: CONTRACTORS' GUIDE

A draft document for professionals on Mold Cleanup Procedures is under development by CMHC. The focus of the document is on information required by contractors involved in renovation and clean-up of mold contaminated houses. As a result of rapidly evolving knowledge in this field, the current draft of the document and its mold cleanup procedures are now being revised to incorporate more current and substantive information from authoritative sources. This document will address mold cleanup in general and will include information on the precautionary measures required to protect workers and occupants, and present best practices for mold remediation. A significant change in approach since preparation of the original draft is the expert consensus that mold remediation should be approached from the perspective of the size of visible mold area rather than the type or toxicity of the molds present.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 2380 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## NORTHERN HOUSING

### COMPARISON OF NORTHERN HOUSING COSTS

This project will outline all components associated with the production of a northern home - from soft to hard, at both the house level and community level to determine which elements, in which locations are inordinately skewing costs. Use of direct data from northern communities will verify these costs. Index communities will allow for comparison of costs between northern communities, and between the North and South. The operationalized database will permit future tracking and analysis such as life cycle performance costs; where use of local labour, indigenous materials and value-added processing of raw, local materials can be developed or expanded to reduce housing costs; and where capacity building may be of benefit.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2370 0200003

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CONTINUATION OF NORTHERN VENTILATION STUDY

This project is a continuation of related CMHC research into ventilation needs and performance in northern homes. Adequate, appropriate and affordable means of ventilation and verification of manufacturer's claims need to be assessed, using an established, consistent methodology. Practical and effective options for ventilation are needed to alleviate potential health problems and building damage. The report will be completed in 2002.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2420 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HEALTHY HOUSING IN THE NORTH: TOWARDS A NORTHERN HEALTHY HOUSE DEMONSTRATION PROJECT

This study is a review of the principles and technical information that can influence the realization of healthy and more sustainable housing in the North. The objective of this study is to begin addressing and enhancing the ecological sustainability, social appropriateness, and total (real) economic aspects of northern housing. The approach is to develop the concept of the Healthy House in a northern context.

People who design and construct housing in the North need to become more conscious of their impact on the environment, social structures and energy use. High environmental and dollar costs of fossil fuel energy in the North demand reconsideration of conventional building design, materials and technical systems. The need for repairing and reinforcing the social fabric calls for appropriate environmental and cultural design to create healthy and locally supported, self-sufficient northern communities. This study reviews and examines influences, aspirations, limitations and potential technical options for increasing sustainability in northern housing.

The study is divided into two parts. Part One is an overview of the northern context, ecological sustainability, social appropriateness, and total (real) economic aspects of northern housing. Part Two is a review of technical options and information resources.

The intent of this study is to encourage the inclusion of environmentally responsible Healthy House concepts, systems and materials in the design, construction, operation, and final disposal of housing. The study is intended for the use of decision-makers who can advance this goal and may include: homebuilders and buyers; community planners, architects, and engineers; regulators and administrators; and policy makers. Northern training institutions could also use the study to supply people with the knowledge and skills to create northern healthy housing solutions.

Ultimately, this study and its guidelines are intended to contribute to northern housing that is more ecologically sustainable and locally and socially appropriate during construction, in operation and at the end of service.

Written by Bob Bromley, Stephen Fancott, Bill Fandrick, Gino Pin. Additional writing by Donna Diakun.  
CMHC Project Manager: Aleta Fowler. Project Manager for Arctic Energy Alliance: Rob Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2002. iii, 76 pages

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



## MONITORING OF THE NORTH ON-SITE WASTE WATER RECYCLING MICROSYSTEMS

Two microsystems were installed in N'Dilo, NWT in the summer of 1998. These microsystems were adapted from the Toronto Healthy House model for Cold Climate application. Monitoring since installation has allowed for fine-tuning and collection of reliable data. In turn, this has proven the microsystems as economical, viable and as one of the most environmentally responsible ways in which to handle water consumption and waste water disposal. Additionally, health benefits to the occupants have been observed through upgrading of water availability. Based upon this data, these systems are now in place, or scheduled for placement in 5 Northern communities and have been marketed successfully internationally. Partners in this project include NWT Housing Corporation, GNWT's Department of Resources, Wildlife and Economic Development, Stanton Regional Health Board, Synergy Solutions and the Dene Housing Authority of Yellowknife. Three years of monitoring data will be compiled into a report.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## NORTH WEB-SITE

The purpose of this partnership project is to renovate the former NoRTH Web Site and maintain this updated dedicated NoRTH Web-Site for a two year period. The project partners are CMHC, Alaska Housing and Finance Corporation, NWT Housing Corporation, University of Alaska (Fairbanks), NRCan and Yukon College. The web-site will include relevant technical information such as factsheets of research reports and the Frostline newsletter. It will also includes discussion groups to provide a means of ongoing and current communication. The web-site will supply links to other relevant web-sites and will be able to be visited at [www.NoRTH-RTHN.org](http://www.NoRTH-RTHN.org). Alaska Housing Finance Corporation will retain a person to post the backlog of articles, to recruit new material needed by Northern audiences, implement the planned next steps such as negotiating links to critical sites, creating a chat room format, etc. and respect the need by CMHC and NRCan to retain their harmonized "look" and post their materials in both French (supplied by CMHC and NRCan) and English.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2369 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet on the web

## NORTHERN HEALTHY HOUSE DEMONSTRATION

A demonstration Healthy House is being planned in northern Canada. This Yellowknife demonstration builds upon a long line of research and is the necessary step in illustrating Healthy House (HH) principles and practices. This demonstration will allow interested parties to view the performance and use of Healthy Housing components, permit informed choices for applications in the North, nationally and internationally, and encourage more widespread adoption of Healthy House and "better" housing and community models. The Demonstration will include an "educational" component and will be open to the public upon completion of construction in 2002.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## NORTHERN HEALTHY MIXED-USE BUILDING DEMONSTRATION

The purpose of this project is to provide financial support for a documented process for creation of a mixed-use, multi-storey building which meets healthy housing objectives and resolves issues of higher upfront costs; site selection and land acquisition in the North; land ownership issues for a unique building; building tenure; Northern financing; Northern regulatory requirements; utility provision; and other pre-development considerations.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2471 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## NORTHERN LANDSCAPING: A GUIDE TO RESTORING THE PLANTS AND SOIL IN NORTHERN COMMUNITIES

This guide looks at ways disturbed northern soils, which are so common, can be made viable for plant growth - and subsequently, determines means of inducing plant growth in these disturbed areas. The guide is intended to help people in northern communities establish low-maintenance, "natural landscaping" appropriate to their region. The information will be useful to anyone involved in a community revegetation project including elected officials, contractors, schools and clubs, and other interest groups. It is not a guide to restoring contaminated sites, industrial sites, or for large ecological restoration projects. It is suitable for smaller-scale planting projects within communities. The emphasis is terrestrial (dryland) areas, though wetland (not fully aquatic) areas are also considered.

Natural landscaping involves the planting of a group of usually native species to meet some specific, aesthetic, management or design goals. Potential project sites are often already semi-natural, such as road embankments, stream edges, vacant lots or other community lands where the plants and soil were disturbed. Areas around homes and other buildings also have potential for natural landscaping. Planting new semi-natural areas which resemble the original ecosystems can beautify the community and produce other benefits, including:

- creation of habitat for wildlife such as birds and squirrels;
- reducing blowing dust;
- protecting soils from erosion;
- providing meaningful ways to educate about the natural environment;
- fostering environmental awareness in a direct, hands-on, way;
- building a sense of community by pursuing and achieving common goals.

Techniques described in this guidebook will help achieve these kinds of goals with little input of energy and resources such as water, fertilizers, and fuel, etc. once the revegetated area is established. A virtually self-supporting system is the goal.

*Prepared by Avens Associates Ltd. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Aleta Fowler. Ottawa: CMHC, 2002. 87 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## UPDATE THE NORTHERN UTILITY COSTS REPORT

In 1995, the NWT Housing Corporation commissioned one of the most useful reports for the North, "Utility Costs in Public Housing". It covered every community in NWT (and in, what is now, Nunavut) outlining the subsidized and unsubsidized rates for water and sewer, electricity and heating. Average cost break-outs were calculated for each region and the percentage of monthly costs allocated toward each utility was measured. This report has been instrumental in justifying and strongly illustrating the cost savings of new technologies such as on-site waste water recycling microsystems. CMHC is updating this utility cost report to expand upon four additional aspects:

- inclusion of the entire North: Labrador, Nunavik, Nunavut, NWT and Yukon;
- the source of electricity (hydro, diesel generator) and whether it is a franchise or not;
- the source of heating fuel (oil, wood, propane, natural gas); and
- a separate category including access to phone and internet service.

The updated report will be available in 2002.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2467 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## USE OF COMPRESSED-AIR-FOAM TECHNOLOGY FOR FIRE PROTECTION OF HOUSING IN THE NORTH

The high cost of northern housing, and housing insurance, may justify the installation of fixed automatic fire-suppression systems. Conventional sprinkler systems require more water than is presently available in buildings and would entail substantial re-design. Further, although sprinkler systems may allow some occupants of the building time to exit, and may allow time for fire fighters and equipment to arrive, water damage in suppressing the fire usually damages the building beyond reasonable repair. The National Research Council of Canada (NRC) has developed a compressed-air-foam (CAF) system which uses 10% of the water required by conventional sprinkler systems. Further, it is designed to extinguish, not just contain or suppress, fires. This study is a partnership project. It will look at the preliminary feasibility of the design of a self-contained CAF system for a building (optimal CAF piping and discharge), assessment of the water requirements for the CAF system, and the development of appropriate CAF nozzles.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2311 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## USE OF ON-SITE WASTE WATER RECYCLING MICROSYSTEMS FOR SPRINKLER SUPPLY

With microsystem technology, excess water of "swimming pool" quality is constantly produced which must be periodically pumped away, or disposed of on-site. This excess water could be easily stored for sprinkler use. In the North, loss of life due to fire is 10 times higher than in the South. Building loss, when a fire occurs, is nearly 100%. Most communities rely upon volunteer fire departments and upon reservoirs which have limited capacity. Alternatives are needed and this study will determine the means and feasibility of taking this next step.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## NORTHERN HOUSING

### YUKON FLEX/HEALTHY HOUSING DEMONSTRATION

Yukon Housing Corporation (YHC) is developing a mortgage incentive program for people who choose to incorporate Flex and Healthy Housing features into their homes. CMHC is partnering with YHC to develop a Demonstration Home which illustrates use of these features and documents the decision-making points, the regulatory issues, the design and construction processes, and the final user reactions. The home will be open to the public for observation as well. Construction is planned for summer 2002; the home will be open to the public shortly thereafter, concurrent with publication of the report documenting the Demonstration.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2469 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PROPERTY MANAGEMENT

### CONTRACT MANAGEMENT COURSE FOR RESIDENTIAL PROPERTY MANAGERS AND BUILDING OWNERS

This project will develop course content to provide an introduction to construction/contract management processes for residential property managers, building owners and anyone involved in the administration of multi-unit residential buildings. The course material will be as applicable to the management of major service contracts as it is to major construction works including repair, replacement and/or rehabilitation projects. Topics covered in this course include the different types of construction or service contracts, a discussion of the construction process, administering the tendering process, evaluating the tendered bids, contractor/consultant selection, bonding and insurance requirements, the building owners responsibilities and those of the contractor/consultant. This project should be completed by late in 2003.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### ECO-ASSESSMENT TOOL FOR PROPERTY MANAGERS OF MULTIPLE UNIT RESIDENTIAL BUILDINGS (MURBS)

The purpose of this project was to develop the MURB Tool with the objective of obtaining a self-assessment procedure which is easily accessible and which is relevant to Canadian property managers.

**STATUS :** Completed

**AVAILABILITY :** Product is available on the web

### REVISIONS TO THE OPERATING GUIDES FOR OWNERS, MANAGERS AND CUSTODIAL STAFF

This project will revise, update, and make print-ready the publications presently known as the CMHC Multi-Residential Manager and Owner Maintenance Manuals. The publications provide best practices for property owners and managers and provide operational instructions for on-site staff.

## PROPERTY MANAGEMENT

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2501 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### TECHNICAL AUDIT COURSE FOR PROPERTY MANAGERS

This project, funded by Canada Mortgage and Housing Corporation in partnership with the Real Estate Institute of Canada, aims to develop a course for property managers on the technical audit of high-rise residential buildings. Using a building as a system approach, this course will provide property managers and building owners with a perspective of the interaction of all building systems and components. Such training is not available to residential property managers in Canada. Technical audits, an organized review of building systems, are an effective way to assess the condition of a building, to understand how the building is performing and to provide a sound basis for making maintenance, repair and upgrade decisions. The course provides the property manager with insights into the technical audit process and highlights the requirements for undertaking technical audits of residential buildings including the scope of the work and the consultant qualifications. The course also introduces the fundamental principles of building science to encourage holistic solutions to building problems. The course documents are expected to be completed by end of 2002.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2297 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RENOVATION AND INSPECTION

### CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS NATIONAL INITIATIVE - PHASE II

With the successful completion of the first phase of this multiphase project, which was to develop national occupational standards for the private home inspection and municipal building code inspection sectors, the Canadian Home Inspectors and Building Code Officials are now preparing for Phase II which is to use the occupational standards to:

- conduct a gap analysis to identify any curriculum and training needs;
- develop curriculum and training programs to meet their needs;
- identify a certification and accreditation model that could be adopted for their industry sectors;
- establish an accreditation program for institutions delivering training programs.

This project is supported by the private and public inspection industry sectors, Human Resources Development Canada (HRDC) and CMHC. A proposal was developed and recently submitted to HRDC requesting their assistance with Phase II. It is anticipated that Phase II will commence in May, 2002 and will be completed by December 2003. Following the completion of Phase II, the two sectors should be in a position to implement the certification programs for their respective industry sectors under Phase III.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 1962 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** There will be no product for this project

## GUIDE FOR THE HEALTHY RENOVATION OF A ONE STOREY HOUSE CIRCA. 1960-1979

The objective of this project is to provide consumer information on typical approaches to the repair and renovation of bungalow-style houses built between 1960-1979. The advice considers occupant lifestyle and needs, structural and maintenance requirements, "Healthy Housing" improvements (including environmental and energy-efficiency), and the impact on home equity and resale value. The publication will include case studies of common renovations to this style of house. The guide will resemble the initial publication in this series which describes appropriate renovations to 1½ storey houses. The report is being prepared for publication.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2202 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HIRING A HOME INSPECTOR. ABOUT YOUR HOUSE; CE35

This fact sheet offers helpful guidance to consumers on questions to ask and what to look for when in the market for a qualified home inspector. The fact sheet was done in consultation with the private home inspection industry through members of the Canadian Association of Home and Property Inspectors (CAHPI) as well as through home and property inspector members of the Canadian Home Inspectors and Building Officials Committee. The fact sheet includes information on the following:

- current situation (who is out there and what regulations exist);
- CAHPI's national initiative (purpose and objectives);
- services provided by home inspectors and why they are needed;
- questions to ask and what to look for when hiring a home inspector; and
- what to expect (time involvement, cost, written report).

*Ottawa: Canada Mortgage and Housing Corporation, 2002, c2001. 4 pages*

Order number: 62839

Note: Aussi disponible en français sous le titre : Le choix d'un inspecteur en bâtiment

**STATUS :** Completed Fact Sheet

**AVAILABILITY :** CMHC Information Products and on the CMHC web site

## MANDATORY HOME INSPECTIONS ON RESALE HOMES IN ONTARIO

A CMHC External Research Program (ERP) grant has been awarded to research the issue of mandatory home inspections for resale homes in Ontario with a number of housing industry interest groups. The results will be an attempt to determine why this requirement was never imposed in the past, the pros and cons of enacting such a requirement in the future, and how could such a requirement be enacted and by whom. The study will also investigate if the existing home inspection industry could handle the increased capacity of such a requirement. The research is underway and is anticipated to be completed by summer 2002.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2437 0200015

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



### **MERGE THE EXISTING NATIONAL AND PROVINCIAL ASSOCIATIONS INTO ONE NEW NATIONAL ENTITY TO REPRESENT THE PRIVATE HOME AND PROPERTY INSPECTION INDUSTRY ACROSS THE COUNTRY**

The objective of this project was to assist the private home and property inspection industry as it merges the existing national and provincial associations into one new national entity, i.e. the Canadian Association of Home and Property Inspectors (CAHPI). CAHPI will represent the private home and property inspection industry across the country. On behalf of CAHPI and the Canadian Association of Home Inspectors (CAHI), a consultant facilitated a planning process and developed a strategy outlining the necessary steps for the orderly progress of this merger into CAHPI. This project is complete and industry is implementing steps for merging their associations.

**STATUS :** Completed

**AVAILABILITY :** There will be no product for this project

### **RECYCLE: LIFECYCLE - HOW TO RENOVATE A HOME FOR CHANGE**

This project's objective is to provide a set of design strategies for adaptable renovations involving a variety of common, detached housing types. The goal of these strategies is to inform homeowners, or prospective homeowners, of ways to achieve the greatest flexibility through alterations and additions to their houses to meet their changing needs.

**CMHC Project Officer :** Thomas Parker

**CIDN :** 2437 0200014

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Research highlight is not yet available

### **REVISION OF HOME CARE: A GUIDE TO REPAIR AND MAINTENANCE**

The purpose of this project is to do a major update and revision of Home Care: A Guide to Repair and Maintenance. As part of the revision, the publication titled New Life for an Old House, which is no longer in print, will also be reviewed and where appropriate the information on home repair will be incorporated into Home Care to produce one comprehensive home maintenance and repair guide. The revised publication will include information from recent research and more specifically on topics including: home inspection, home repair (not renovation), home maintenance, Healthy Housing and FlexHousing tips, and how to hire a contractor, as part of the update. The content will emphasize Canadian issues whenever possible to differentiate it from similar American products. A steering committee comprised of First Nations members, a home inspector and CMHC staff has been struck to help guide the consultant. Revisions to the manuscript are currently underway and are anticipated to be complete by Summer 2002.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2516 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### DESIGN CHARRETTES TRANSFORMING YOUR PRACTICE - INTEGRATED DESIGN CHARRETTES FOR SUSTAINABLE BUILDINGS

The objective of this project is to inform participants of the latest research findings on sustainable building design and to train participants in the methodology of the integrated design process and the tools required in designing sustainable building, so that they can initiate this process in their own design practices. Integrated Design Charrettes will be organized in different cities across Canada.

**CMHC Project Officer :** Sandra Marshall

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2474 0200002

**STATUS :** Ongoing

**\*NEW\***

### DEVELOP A SET OF ENVIRONMENTALLY SUSTAINABLE SITE AND BUILDING DESIGN, CONSTRUCTION AND OPERATION GUIDELINES FOR SINGLE AND MULTI-FAMILY UNIT HOUSING, MOTELS AND HOTELS FOR THE TOWN OF BANFF

The purpose of this project is to develop a set of environmentally sustainable site and building design, construction and operation guidelines for single and multi-family unit housing, motels and hotels for the Town of Banff in a manner which could be used to inform the development of similar guidelines for other communities across Canada.

**CMHC Project Officer :** Doug Pollard

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2309 0200001

**STATUS :** Ongoing

### LIVING BY WATER GUIDEBOOK

The objective of this project is to prepare, publish, market and distribute a guidebook for waterfront residents on reducing environmental impacts of housing on aquatic and shoreline habitat.

**CMHC Project Officer :** Susan Fisher

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2040 0200001

**STATUS :** Ongoing

### TRANSFORMING YOUR PRACTICE: INTEGRATED DESIGN CHARRETTES FOR SUSTAINABLE BUILDINGS: TORONTO CHARRETTE RESULTS

This charrette took place in Toronto, at the City of Toronto's Metro Hall, November 7th and 8th, 2001. The objective of the Toronto Charrette event was to use the integrated design process (IDP) to push the boundaries of building performance towards more sustainable practices. The sessions were intended to take a varied complement of professionals through an integrated design process in the context of a new project, so that they would "learn by doing" and be able to use IDP within their own practice.

Four partners supported Canada Mortgage and Housing Corporation in this event: Enbridge Consumers Gas, City of Toronto's Better Buildings Partnership, Natural Resources Canada's Office of Energy Efficiency, and the Canadian Energy Efficiency Alliance.

The goals of the partners were to:

- Establish a forum where a multi-disciplinary group of design professionals could work together on a sustainable design project,
- Gain insights into sustainable building practices, and

## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

-- Learn how to advance building performance, starting from design conception to understanding of operations issues, building on each others' unique perspectives and expertise.

This document discusses the integrated design process and reports on the results of the charrette.

*Prepared by IndEco Strategic Consulting Inc. Prepared for Canada Mortgage and Housing Corporation.  
CMHC Project Officer: Sandra Marshall. Toronto: IndEco Strategic Consulting Inc., 2002. 96 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** On a loan basis from: Canadian Housing Information Centre

## WATER CONSERVATION, REUSE & MANAGEMENT

### CASE STUDIES OF WATER CONSERVATION INITIATIVES IN MULTIS

CMHC, in partnership with City of Toronto Better Buildings Partnership, will document case studies of water conservation retrofits for multi unit residential buildings. The building profile, water conservation measures, costs and resulting water and energy savings will be described. The studies will serve as examples to encourage water use efficiency in other building and will appear on CMHC's website.

**CMHC Project Officer :** Catherine Soroczan

**CIDN :** 2239 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### DUAL FLUSH TOILET PILOT PROJECT

CMHC is working with a number of municipalities across the country to conduct a pilot program for dual flush toilet systems in a variety of buildings. This study will monitor water consumption and toilet performance as well as customer satisfaction with the dual flush system. Twelve agencies from eight provinces are participating in the project which will see toilets installed in single family homes, multi unit residential buildings, municipal and commercial buildings. These dual flush toilets will be compared to typical 13L and 20L toilets as well as Ultra Low Flow 6L toilets on a consumption and cost basis. Anticipated results of this work will be the increased awareness of dual flush systems across the country, and an improved ability to overcome regulatory, technical, and perceptual obstacles.

**CMHC Project Officer :** Catherine Soroczan, Sandra Baynes

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**CIDN :** 2336 0200

### ECONOMIC FEASIBILITY STUDY OF WATER REUSE AND TREATMENT TECHNOLOGIES

The purpose of this project is to undertake and complete an economic feasibility study of water reuse and treatment technologies. The contractor will assess ten case studies of on-site water reuse applications. The final draft has been received and the case studies will be uploaded to the CMHC water website on a monthly basis. Further attention is being paid to the financial aspects of water reuse and full costing.

**STATUS :** Completed

**AVAILABILITY :** Product is available on the web



## IMPLEMENTATION STRATEGIES FOR WATER CONSERVATION

The objective of this project is to evaluate the effectiveness of CMHC's Household Guide to Water Efficiency. The project entails studying the indoor and outdoor water consumption in four distinct, yet similar residential communities of approximately 300 to 500 homes each in the region of Halton. Different levels of program delivery will be assigned to each community.

**CMHC Project Officer :** Catherine Soroczan

**CIDN :** 2506 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet on the web

**\*NEW\***

## MAXIMUM DAY WATER DEMAND REDUCTION MONITORING AND EVALUATION PROJECT

The objective of this project was to identify and implement a water efficiency measure targeted at reducing maximum day water demands and be responsible for all related costs associated with implementing the identified measure - these costs will depend on the measure selected by each municipality and the method of implementation used. Preliminary results have been received in draft form. Results show that indoor water consumption was reduced for a number of the conservation methods used. A follow-up study commenced Summer 2001 to determine: impact on outdoor water consumption and whether conservation is maintained over a long period.

**STATUS :** Completed

**AVAILABILITY :** Product is available on the web

## MAXIMUM DAY WATERING DEMAND PHASE II - ASSESSMENT OF WATER CONSERVATION STRATEGIES

This project's objective is to determine the impact of the Household Guide to Water Efficiency on indoor and outdoor water consumption. Specifically it will seek to address the questions: Is the impact on consumer behaviour maintained in the long term, what effect does the Guide have on outdoor water use during the summer months, and what extra impact does a complementary social marketing campaign have on consumer behaviour? This work is part of the second phase of the Max Day project initiated in 2000, which saw a reduction in consumption rates based on conservation method used.

Although not conclusive, the data analysis indicates that demands were reduced in the two study areas after the related programs were implemented. The data related to the Survey Area was not conclusive as there was almost no irrigation subsequent to the survey being performed. It appears that the distribution of the Household Guide to Water Efficiency was responsible for a savings of between 34-54 litres per household per day (combined indoor and outdoor use). The analysis also shows that the "Drop-Off" and "Phone" methods of delivery had cost-benefit ratios of .39 and .37 respectively i.e. both methods are more than twice as cost-effective as infrastructure expansion. The widely fluctuating irrigation demands during the summer of 2001 make it difficult to accurately assess the effectiveness of the three methods of distributing the Household Guide to Water Efficiency. The analysis was further complicated by the implementation of a watering ban during the monitoring period.

**CMHC Project Officer :** Catherine Soroczan, Sandra Baynes

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**CIDN :** 2341 0200003

## PERFORMANCE ASSESSMENT OF LOW FLOW TOILETS

This project's objective was to set up and conduct a monitoring program to verify the flush volumes of Ultra Low Flow (ULF) toilets installed in single-family homes as part of Durham's retrofit program. Initial results indicated that depending on the brand of toilet installed there is a mixed reaction to ultra low flow technology.

**STATUS :** Completed

**AVAILABILITY :** Product is available on the web

## REMOTE MONITORING AND CONTROL OF ON-SITE WASTEWATER TREATMENT, RECYCLING AND RE-USE SYSTEMS

This External Research Project addresses remote monitoring and control of systems for on-site wastewater treatment, recycling, and re-use. Effective, reliable, and long-term performance of even the simplest of these systems requires at least periodic monitoring, and the most sophisticated systems require continuous monitoring and control capability.

There are two objectives to this research: 1. To produce a resource document for multi-stakeholders: planners, managers, regulators etc. who have interests or responsibilities related to systems for on-site wastewater treatment, recycling, or reuse; and 2. To produce a supplementary document that will propose ways in which the contents of that document can be communicated most effectively to those users.

**CMHC Project Officer :** Sandra Baynes

**CIDN :** 2437 0200020

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## SAFE EFFLUENT WASTEWATER RECOVERY SYSTEM (SEWRS)

This project is focusing on greywater systems for single family homes. Although the performance data collection will be for homes in southern Ontario and thus be not directly to the more northern parts of Canada, the final report will address changes required in these systems for application in the colder climate of the North.

**CMHC Project Officer :** Sandra Baynes

**CIDN :** 2437 0200022

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## WATER AND SEWAGE HANDLING SYSTEMS IN NORTHERN AND REMOTE COMMUNITIES

This project's objective is to collect and publish in fact sheet format the following information on water and sewage handling systems in northern and remote communities: description of the technology and construction, engineering application and performance, capital and operating costs and any available user case studies. It is proposed that this project include the demonstration and monitoring of 6-10 "EcoSeptic" micro-sewage systems in a northern Ontario or Manitoba community with severe pollution problems that is willing to consider less costly alternatives to conventional sewage infrastructure. A suitable test site/community for the demonstration of "EcoSeptic" micro-sewage systems has not yet been secured. However another developer of an innovative micro-sewage system has secured five test installations in southern Ontario and Quebec. It is planned that these systems will be monitored for a period of at least eighteen months.

## WATER CONSERVATION, REUSE & MANAGEMENT

**CMHC Project Officer :** *Chris Ives*

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** N/A

**STATUS :** Ongoing

**\*NEW\***

### WATER EFFICIENCY CASE STUDIES

The purpose of this project is to develop six case studies focusing on specific residential water efficiency initiatives that are being delivered by six cities across Canada. Final product will be available on the web site.

**CMHC Project Officer :** *Sandra Baynes*

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2239 0200004

**STATUS :** Ongoing

**\*NEW\***

### WATER QUALITY MONITORING OF THE TORONTO HEALTHY HOUSE

The purpose of this project is to undertake the collection of water samples along various points from the Toronto Healthy House Water Reuse System and have them analyzed for a number of water quality parameters. Monitoring is underway and is scheduled for completion mid 2002.

**CMHC Project Officer :** *Catherine Soroczan, Sandra Baynes* **CIDN :** 2337 0200002

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**STATUS :** Ongoing



## SOCIO ECONOMIC RESEARCH



### ADAPTATION OF POTENTIAL HOUSING DEMAND MODEL TO ABORIGINAL COMMUNITIES - AN EXAMPLE

This study will build on the results of a feasibility study that looked at the application of CMHC's potential housing demand model in Aboriginal communities. It will take the recommended actions and apply them to a test case of the Nishnawbe Aski Nations (NAN), a grouping of 49 bands in Northern Ontario. Some specific tasks will be: to monitor the degree of difficulty that NAN administrators encounter in gathering accurate input data, to refine the assumptions on headship rates and household types that will be parameters for the model. Eight communities from NAN will be piloted in a first phase, and if successful, the other communities will follow as Phase 2.

**CMHC Project Officer :** Phil Deacon

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### COMMUNICATIONS & INFORMATION TRANSFER STRATEGY FOR ABORIGINAL GROUPS

The goal of this project was to develop a communications and information transfer strategy that will help CMHC in its interactions with Aboriginal housing groups regarding capacity development, research and information transfer activities. To be effective, information has to reach the audience that matters and be in formats that have the maximum impact.

The study looked at the barriers to finding and using housing related information, what makes housing related information relevant, what are key influences, and how effective are the available communications vehicles and distribution channels, all in regard to Aboriginal audiences.

The project consisted of: an assessment of existing communication strategies and marketing research in the area of housing information and training; personal or telephone interviews with senior officials of key national and provincial stakeholder groups; group discussions with a broad range of the key client groups as defined in target audiences; and development of alternative communications and information transfer strategies for CMHC and assessment of their relative costs.

The target audience for this project is made up of: key decision makers in housing operations and policies, provincial organizations chosen to give regional coverage, major national organizations, and regional CMHC program officers.

The geographic coverage is Canada wide. All types of Aboriginal community, on or off-reserve in rural, remote and urban communities are included.

*Prepared by Poirier Communications. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Philip Deacon . S. I.: Poirier Communications, 2000.*

*2 volumes: vol. 1 Final Report (130 pages); vol. 2: Dialogue Circle Transcripts (85 pages)*

**STATUS :** New Completed Report

**AVAILABILITY :** On an Interlibrary Loan basis from:  
Canadian Housing Information Centre



## ALTERNATE ABORIGINAL TRAINING DELIVERY OPTIONS

Experience over the past several years has shown the need to explore alternate approaches to delivery of training to First Nations (FN) communities and other Aboriginal groups. A small study is underway to look at the feasibility of FN and other Aboriginal groups sharing training expertise and resources by a number of innovative techniques, to supplement the more conventional approach.

The study will examine the various possibilities of training sharing, how logistics could work, what sort of recompense the trainer or "training community" should expect, etc. It is hoped that the results will point to directions that may extend training delivery resources, provide more effective "hands on" training, and support capacity development.

**CMHC Project Officer :** Marcelle Gareau

**CIDN :** 01PLO-8426

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## EFFECTS OF URBAN ABORIGINAL RESIDENTIAL MOBILITY AND SERVICE PROVISION

This project will examine the effects of Aboriginal urban mobility upon service provision in areas such as housing, education, and health care in both the private and public sectors. The project is aimed at examining the effects of Aboriginal urban mobility upon the provisions of services to Aboriginal people in Winnipeg and Regina.

**CMHC Project Officer :** Marcelle Gareau

**CIDN :** 2436 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## EXAMINING INUIT SPACE USE IN EURO-CANADIAN HOUSE FORMS

This project is intended as the initial phase of a long term investigation of Inuit spatial behaviour in Euro-Canadian house forms.

**CMHC Project Officer :** Marcelle Gareau

**CIDN :** 2437 0200019

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## FIRST NATIONS HOUSING PROPERTY MANAGEMENT TRAINING COURSES AND RESOURCES

This project's objective is to undertake and complete the identification and assessment of First Nations housing property management training courses and resources and provide recommendations for a comprehensive curriculum and innovative approaches to delivery in remote communities.

**CMHC Project Officer :** James A Rockwood

**CIDN :** 2374 1500001

**Division :** Assisted Housing Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## INVESTIGATING AND DOCUMENTING FIRST NATION TECH SERVICES INSTITUTES

The objective of this project is to undertake the profiling of three First Nation technical services organizations for the purpose of documenting organizational success factors in a user-friendly framework.

**CMHC Project Officer :** Alain Croteau

**Division :** Assisted Housing Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2475 1500002

**STATUS :** Ongoing

**\*NEW\***

## MEASURING RESIDENTIAL MOBILITY OF URBAN ABORIGINAL PEOPLE

This pilot study provides information about how a survey methodology can be used to identify patterns of residential mobility among urban Aboriginal populations. The objectives of this pilot study were to design and test such a survey methodology, not to support statistically significant inferences for Aboriginal populations in urban centres. A questionnaire was developed and tested with a sample of 144 Aboriginal respondents living in two urban centres -- Toronto (73) and Winnipeg (71). The sample included respondents from First Nations (96), Métis (40), Inuit (4) and other Aboriginal groups (4). Fourteen Aboriginal organizations in the two selected cities identified respondents, the majority of whom were women, and participated in the survey administration. Information was gathered between November, 1999 and January, 2000 using in-person interviews, telephone interviews and self-administered questionnaires.

Substantive issues dealt with general topics such as residential migration and mobility, frequency and duration of homelessness, current and projected housing needs, empirical linkages and diversity (gender, income, employment, education) of the study population. Survey design issues dealt with Aboriginal consultations, representative pre-testing, literacy and survey administration methods. Respondents took an average of 35 minutes to complete the pre-test version of the questionnaire. The section on Moves (Migration and Mobility) provided the greatest recall challenge for respondents.

The pilot study demonstrated that details of past moves can be tracked, within limits. The survey tracked up to three moves within a five year time period based on respondent recall. Field team reports indicate this horizon may be the practical limit of accurate recall. Some data quality problems were associated with questions such as changes in household type and size. The pilot survey explored the reasons and motivations behind the moves of Aboriginal people living in urban areas -- what some experts characterize as "push" and "pull" factors. While very preliminary, the pilot survey results were broadly similar to the results of the 1991 Aboriginal Peoples Survey (APS) which showed that family, employment, housing and education are the major reasons for moving. The pilot survey also successfully identified reasons for moves, using questions or probes to identify different types of housing-related reasons for moves. Reasons differ for in-city (mobility) versus to-city (migration) moves. Housing was a bigger factor for in-city moves while work and education were more important for people moving across city boundaries.

The pilot survey explored in some detail housing-related reasons for moving such as affordability, better quality, and housing that better suits household needs. Cumulatively, these different housing-related factors were identified by almost two-thirds of respondents as underlying their most recent move. This is much higher than the percentage of respondents to the APS who identified housing as a factor in either migration or mobility.

*Prepared by Turtle Island Associates. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Philip Deacon. Ottawa: CMHC, 2002 printing. (Aboriginal Housing Series) 86 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## ABORIGINAL HOUSING

### URBAN ABORIGINAL PERCEPTIONS OF ACCESS TO HOUSING

The objectives of this project are:

- 1) To obtain baseline data on the nature and extent of discrimination in housing that Aboriginal people experience - case studies focus on Winnipeg and Thompson, Manitoba.
- 2) To quantitatively and qualitatively examine the key variables associated with housing discrimination for Aboriginal people, including such factors as residential migration/mobility, social cohesion, and ethnic clustering.
- 3) To explore the effect that discrimination in housing for Aboriginal people has with regard to other victimization. This will be done by comparing the housing related factors to a more general survey of victimization (National Community Victimization Project) being carried out by Simon Fraser University with a SSHRC grant.

**CMHC Project Officer :** *Phil Deacon*

**CIDN :** 1990 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### URBAN ABORIGINAL RESIDENTIAL MOBILITY

This project's objective is to examine the effects of urban Aboriginal residential mobility upon public and private service provision in areas such as the housing, education and health care sectors in the Census Metropolitan Areas of Regina, Saskatchewan and Winnipeg.

**CMHC Project Officer :** *Marcelle Gareau*

**CIDN :** 2436 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## CHILDREN'S ENVIRONMENTS

### HOUSING FORM AND QUALITY IN RELATION TO CHILDREN'S MENTAL HEALTH

This External Research Project (ERP) will examine whether housing form and quality are related to the socio-emotional health of children. It will use standardized measures of housing quality and mental health, two major housing forms (single family and low-rise cluster), and will consider the role of various potentially moderating influences, including socioeconomic status and indoor population density to answer the basic question: "How, if at all, does housing form and quality affect the socio-emotional health of urban Canadian children."

**CMHC Project Officer :** *Fanis Grammenos*

**CIDN :** 2437 0200013

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## CONCEPT OF A QUALITY LOCATION AND THE CENTRAL DISTRICTS OF MONTRÉAL

The primary scope of the proposed research will be to develop an approach based on sustainable development and aimed at better evaluating the capacities of an urban area to enhance its living conditions. In so doing, we believe that the proposed approach will support any measures to establish more effective guidelines for the improvement of these capacities.

**CMHC Project Officer :** Paul Cardinal

**CIDN :** 2437 0200008

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## DEMONSTRATION OF FULL-COST ACCOUNTING TOOLS AND TECHNIQUES

The objectives of this project are:

1. To demonstrate the benefits of using full-cost accounting tools and techniques to evaluate the social, economic and environmental costs and impacts associated with urban growth.
2. To analyze the full costs and impacts of growth in selected infrastructure areas for the Fraser Valley Regional District as a case study for these purposes.

**CMHC Project Officer :** David D'Amour

**CIDN :** 2127 0200001

**Division :** Strategic Planning Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## REQUALIFICATION OF SUBURBS AND REGULATORY FRAMEWORKS: CURRENT SITUATION AND EASING MEASURES

The objectives of this study are, first, to analyze the current regulatory frameworks that could support proposals for the requalification of Quebec suburbs and, second, to propose measures that could be introduced to make it easier for these districts to adapt to the social and physical changes that they are undergoing.

**CMHC Project Officer :** Philippe LeGoff

**CIDN :** 2437 0200018

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## WHY CITIES MATTER: CANADIAN CITY-REGIONS IN A GLOBAL AGE

This project aims to further the learning process within and across policy communities by mapping the knowledge about city-region experiences.

**CMHC Project Officer :** Mark Holzman

**CIDN :** 2543 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### ISSUES PAPER ON LIABILITY IN HOUSE CONSTRUCTION

This project's objective is to produce a paper discussing the issue of liability in housing construction across Canada and identify who is and is not liable.

**CMHC Project Officer :** Mark Holzman  
**Division :** Policy and Research Division  
**AVAILABILITY :** Product is not yet available

**CIDN :** 1920 0200001  
**STATUS :** Ongoing

## COOPERATIVE AND NON-PROFIT HOUSING

### 2001 COOPERATIVE HOUSING SURVEY

The purpose of this project is to complete the required inspections under the 2001 cooperative housing survey, prepare reports and submit completed reports to the survey consultants.

**CMHC Project Officer :** Allan Dobie  
**Division :** Audit and Program Evaluation Services  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2439 0501002  
**STATUS :** Ongoing  
**\*NEW\***

### COOPERATIVE HOUSING PROJECTS IN DIFFICULTY

The purpose of this project is to analyze the causes of cooperative housing projects being in difficulty.

**CMHC Project Officer :** Graham Murray  
**Division :** Audit and Program Evaluation Services  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2485 0500008  
**STATUS :** Ongoing  
**\*NEW\***

### COST OF CO-OPERATIVE HOUSING

The purpose of this project is to conduct a study of the cost of cooperative housing.

**CMHC Project Officer :** Graham Murray  
**Division :** Audit and Program Evaluation Services  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2439 0501001  
**STATUS :** Ongoing

### CRISIS SITUATIONS IN COOPERATIVES: INCREASING UNDERSTANDING TO IMPROVE INTERVENTION

This research project concerns crisis situations in housing cooperatives: the conditions in which they emerge, but especially the dynamics put in place to resolve them.

**CMHC Project Officer :** Marie Murphy  
**Division :** External Research Program  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2018 0200001  
**STATUS :** Ongoing

## COOPERATIVE AND NON-PROFIT HOUSING

### EVALUATION OF COOPERATIVE HOUSING

The objective of this project is to conduct surveys for an evaluation of cooperative housing. Original data will be gathered from surveys of occupants of cooperative housing projects (and of occupants of other housing types for comparative purposes), from members of boards of directors and managers of housing projects, and from portfolio managers. In addition, an inspection of housing conditions will be completed by professional building inspectors.

**CMHC Project Officer :** *Graham Murray*

**CIDN :** 2485 0500001

**Division :** Audit and Program Evaluation Services

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### PUBLIC HOUSING TENANT SELF-MANAGEMENT: AN EVALUATION OF THE ALEXANDRA PARK CO-OP CONVERSION PROCESS IN TORONTO

The purpose of this project is to produce an independent review and analysis of the conversion process that has taken place at Alexandra Park/Atkinson Co-op.

**CMHC Project Officer :** *Vernon Barkwell*

**CIDN :** 2305 0200020

**Division :** Policy and Research Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

## DISCRIMINATION IN HOUSING

### HOUSING DISCRIMINATION IN CANADA: THE STATE OF KNOWLEDGE

This report is based on a review of research findings on housing discrimination in Canada, an assessment of the strengths and weaknesses of the research methods used, and a field consultation on current issues with informants from various stakeholder groups, e.g., landlord representatives, tenant advocates, real estate and financial representatives.

Much of the research has focused on perceptions of discrimination among ethno-racial minority groups. Generally, the studies are small-scale, use survey methods, use measures of perceived discrimination, and are limited to a few cities and to the rental sector. Findings from quantitative studies conducted from 1957 to 1996 show that racial discrimination is a continuing problem. More recent studies have documented discrimination against women. Other legally prohibited grounds for discrimination, e.g., family status, receipt of social assistance, age, disabilities, and sexual orientation, have not been part of any systematic research. Virtually nothing is known about discrimination in the housing sales market, mortgage lending, or home insurance.

There is widespread agreement that the existing data on housing discrimination are inadequate for directing policy decisions. This report concludes with a research agenda that would address current knowledge gaps.

*Prepared by Sylvia Novac, Joe Darden, David Hulchanski, and Anne-Marie Seguin with the assistance of Francine Bernèche. CMHC Project Officer: Phil Deacon. Ottawa: Canada Mortgage and Housing Corporation, 2002. 96 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



## HOME OWNERSHIP

### ENHANCING THE APPLICABILITY AND USEFULNESS OF CMHC'S HOMEOWNER'S MANUAL FOR NEW HOMES

This project's objective is to expand the content of the existing Homeowner's Manual to reflect a wide range of current house construction systems and components and to enhance the Manual with additional features in order to increase the usefulness of the manual for the home purchaser and its appeal to builders and realtors.

**CMHC Project Officer :** Fanis Grammenos

**CIDN :** 2493 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## HOMELESSNESS

### APPLICABILITY OF A CONTINUUM OF CARE MODEL TO ADDRESS HOMELESSNESS

This project will examine the applicability to Canada of a continuum of care (CoC) model by conducting in-depth case studies of the CoC model in four American communities. The project will analyze the benefits and limitations of each CoC program and review its applicability in addressing homelessness in Canadian urban centres.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2353 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### CAUSES AND CONDITIONS CONTRIBUTING TO FAMILY HOMELESSNESS AND APPROACHES TO ADDRESSING FAMILY HOMELESSNESS

This research project will provide an overview of the observable trends in the causes and conditions of family homelessness in Canada. Both the systemic/structural factors and the individual family circumstances that come to play in making families vulnerable to becoming homeless will be examined. As well, the project will investigate ways and means of addressing family homelessness through prevention, crisis intervention and re-integration strategies. Existing, emerging and innovative strategies which have proven effective or are in the vanguard of new initiatives will be reviewed. Those who provide assistance to and advocate for homeless or vulnerable families and families who are, or recently were homeless, will be consulted.

**CMHC Project Officer :** Jim Zamprelli

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### EVALUATING HOUSING STABILITY FOR PEOPLE WITH SERIOUS MENTAL ILLNESS AT RISK FOR HOMELESSNESS: FINAL REPORT

This report describes the development of a Housing Stability Benchmark Evaluation Procedure by the Community Support and Research Unit (CSRU) at the Centre for Addiction and Mental Health. Housing stability for people with serious mental illness (SMI) at risk of homelessness is a concept

that has remained under-developed in the research literature. This project began by convening a Housing Stability Steering Committee. A primary task of the steering committee was to work with the CSRU study team to develop a model of housing stability. In addition, a scan of the published and non-published research and program evaluation literature was conducted to identify the factors at various levels that are associated with better housing outcomes for people with SMI.

Based on the model and findings from the scan of the literature, and working with the steering committee, a table of housing stability objectives, benchmark practices and monitoring strategies was developed. In addition, a series of data collection tools were created to complete a housing stability master data sheet. The tools are used to collect information about a housing program's practices. Once entered into a master data sheet, the program's practices are compared to housing stability benchmark practices. This comparison leads to the development of action plans to improve current program practices. The tools developed for this project were pilot-tested with three housing programs in Toronto representing custodial, supportive and supported housing models.

*Prepared by Community Support and Research Unit, Centre for Addiction and Mental Health. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Anna Lenk. Ottawa: CMHC, 2001. 206 pages*

NOTE: No. 100 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

### GOVERNANCE IN LOCAL PARTNERSHIPS TO ADDRESS HOMELESSNESS

This research will identify tools and strategies for problem-solving and decision-making within complex partnerships. This will be done by examining case studies of methods and structures of collaboration among community-based agencies and municipal governments, working on homelessness issues.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2426 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### INVOLVING HOMELESS AND FORMERLY HOMELESS CLIENTS IN PROJECTS AND PROGRAMS TO ADDRESS HOMELESSNESS: FINAL REPORT

This report is based on a study of the ways in which agencies that address homelessness involve their homeless clients in the work of the agency itself, through participation in governance structures, development of policies, work (both volunteer and paid), research and evaluation, building design and development, creative activities, community projects and training/mentorship activities.

The study examined the involvement approaches of twelve agencies in different locations across Canada. The agencies were selected to achieve good regional representation, as well as in terms of the services and programs provided and the characteristics of the homeless population served. Agencies providing services to adult women and men, youth, families and First Nations people were studied in Halifax, Fredericton, Trois-Rivières, Montréal, Toronto, Hamilton, Winnipeg, Regina, Calgary, Edmonton, Vancouver, and Victoria. The types of services provided include emergency shelter, drop-ins, supported housing, newsletter production, education/training, and counselling.

At each of the twelve sites, interviews and group discussions were conducted with management and front line staff and homeless clients of the particular agency. The final report examines the successes, pitfalls and future challenges of involving clients.

## HOMELESSNESS

Prepared by Jim Ward Associates. Funded jointly by Canada Mortgage and Housing Corporation and the National Secretariat on Homelessness. CMHC Project Officer: Jim Zamprelli. Ottawa: CMHC, October 2001. 63 pages

NOTE: No. 98 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

### STUDY OF TENANT EXITS FROM HOUSING FOR CHRONICALLY HOMELESS PEOPLE

This project's objective is to study the current residents and the recent evictees from a Toronto agency that has a long history of providing innovative housing and related services for the chronically homeless and 'hard to house'. It is a study of the users of the services provided by the agency, not the agency itself.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2305 0200013

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSE CONSTRUCTION INDUSTRY

### HOUSING CONSTRUCTION INDUSTRY: CHALLENGES AND OPPORTUNITIES FOR THE 21ST CENTURY

This research project will examine the evolution of the housing industry in Canada since the mid-1980s, and the industry's current and expected future challenges in the period to 2010. The study will also identify research issues which merit further investigation and study.

**CMHC Project Officer :** Ian Melzer

**CIDN :** 1987 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### INDUSTRY PROFILE OF CANADIAN LIGHT STEEL BUILDING

This research will provide an overview of the current Canadian lightweight steel framing industry.

**CMHC Project Officer :** Jessica Li

**CIDN :** 2431 0900002

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## POTENTIAL ELEMENTS OF A HUMAN RESOURCES DEVELOPMENT STRATEGY FOR THE RESIDENTIAL CONSTRUCTION INDUSTRY

This project's objective is to briefly discuss the unique challenges confronting the housing sector in terms of labour supply and to outline the main components of a human resources development strategy for the residential construction industry. The paper is intended to form the basis of discussion at an upcoming facilitated workshop wherein the potential elements of a human resources development strategy for residential construction will be further refined and developed.

**CMHC Project Officer :** David D'Amour

**Division :** Strategic Planning Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2500 0100001

**STATUS :** Ongoing

**\*NEW\***

## PRODUCTIVITY TRENDS IN THE CONSTRUCTION SECTOR IN CANADA: A CASE OF LAGGING TECHNICAL PROGRESS

The objective of this report is to provide a detailed examination of productivity trends in the construction industry in Canada, with particular reference to residential construction, in order to shed light on the lagging productivity in the sector.

Both labour and total factor productivity growth in the total and residential construction sectors in Canada have been negative over the past two decades. This report provides a detailed examination of output, employment, and productivity trends in the construction sector in Canada and by province, with particular attention to the residential construction sector. It puts forth a number of variables to explain these trends and tests these explanations in a regression model. In addition, the report looks at other potential explanatory factors for which time series are not available, with particular reference to measurement issues and technical change; discusses the micro- and macro-economic environment affecting productivity performance in the construction sector; examines the prospects for productivity growth in the construction sector; and makes a number of recommendations for future work. The major conclusion is that lagging technical progress appears to lie at the root of the construction sector's poor productivity performance. In addition, measurement problems have also likely contributed to the poor measured productivity performance in the sector.

*Final Report prepared by the Centre for the Study of Living Standards. CMHC Project Officer: Eric Tsang. Ottawa: Canada Mortgage and Housing Corporation, 2001. ca 350 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** NOTE: Available on a loan basis only from: Canadian Housing Information Centre

## SUPPLY OF LABOUR IN THE RESIDENTIAL CONSTRUCTION INDUSTRY

The purpose of this project is to increase awareness and understanding of the impacts of labour shortages on housing markets, and to explore the information, tools and techniques required to better manage residential construction labour supply.

**CMHC Project Officer :** David D'Amour

**Division :** Strategic Planning Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2357 0100001

**STATUS :** Ongoing

**\*NEW\***

## DISINVESTMENT AND THE DECLINE OF URBAN NEIGHBORHOODS

Disinvestment and decline occur in inner city neighbourhoods throughout North America. The process is often associated with poverty, high levels of crime, conversion of single family to multi-family housing units, abandonment of the housing stock, and out-migration (movement of the middle class from inner city neighbourhoods to the suburbs). Other features of neighbourhood disinvestment and decline are mortgage redlining, exit of retail business, conversion to lower forms of non-residential land uses such as marginal business operations and specialized services for the poor, decline in relative or absolute land values, and in migration by economically marginalized populations.

This research examined the processes of urban disinvestment and decline with four objectives:

- to develop an understanding of forces and factors that trigger and accelerate decline;
- to create a framework for action that can stem and reverse decline;
- to examine the role of investment in housing as a primer of regeneration; and
- to identify opportunities for concrete action involving partnerships.

The research aims to inform the development of public policy, primarily at the local and municipal levels, by articulating a range of policies that can work to prevent or reverse inner city decline.

The research comprises four main sources of information: a literature review, key informant interviews in six cities, group interviews in two cities, and analysis of Statistics Canada data. Together, the case studies: examine the extent to which the experience of the six selected cities conforms to the literature; identify the range of responses to urban decline being implemented in the Canadian context and evaluate them; and identify best practices in urban revitalization and renewal.

Ottawa: *Canada Mortgage and Housing Corporation, 2001. (Research Highlight: Socio-Economic Series; 90). 6 pages* Order number: 62512

NOTE : Aussi disponible en français sous le titre : Le désinvestissement et le déclin des quartiers en milieu urbain

**STATUS :** Completed Research Highlight

**AVAILABILITY :** CMHC Information Products and the web

## ENVIRONMENTAL SCAN OF HOUSING SECTOR GIS PRACTICES

This project's objective is to perform an environmental scan of housing sector GIS practices.

**CMHC Project Officer :** Roger Mareschal

**Division :** Market Analysis Centre

**AVAILABILITY :** Product is not yet available

**CIDN :** 2392 1000001

**STATUS :** Ongoing

**\*NEW\***

## HOUSING NEEDS OF LOW-INCOME PEOPLE LIVING IN RURAL AREAS

This project is intended to be a preliminary investigation of the housing needs of low-income people living in rural areas, including the existence of homelessness. The methodology includes a statistical profile, mainly from the Census, but supplemented by any surveys which have been done by the provinces/territories and by qualitative research to more finely identify issues affecting very low income or otherwise vulnerable households.

**CMHC Project Officer :** Anna Lenk

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2367 0200

**STATUS :** Ongoing

## IDENTIFICATION OF KNOWLEDGE GAPS IN DISASTER INFORMATION FOR HOUSEHOLDERS IN CANADA: FINAL REPORT

This short survey project assembled and reviewed existing housing information related to 'disasters' to assess if and where additional research may be required. The review concentrated on housing and housing issues. This research investigates information prepared for householders by organizations in Canada, the United States, Britain, Australia and France. Material was collected and analyzed for the following fifteen threats: avalanches; cold waves; drought; earthquakes; forest fires; house fires; flooding; hail; heat waves; landslides/mudslides; multiple coverage; power outages; tornadoes, torrential rain; and winter storms. The report assesses the suitability of the information for the intended audience and identifies gaps in the current consumer information.

*Prepared by John Newton. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Don Fugler. Toronto: John Newton Associates, 2001. 82 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Available on an interlibrary loan basis from: Canadian Housing Information Centre

## INTERGENERATIONAL HOUSING TRENDS AND CHALLENGES

This project's objective is to complete an issue paper on intergenerational housing trends and challenges.

**CMHC Project Officer :** Leanne Elliott

**CIDN :** 2409 0100001

**Division :** Policy and Research Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

## NATIONAL CONSULTATION TO EVALUATE "HOME\$AVE" AN ASSET-BASED APPROACH TO ANTIPOVERTY USING HOUSING AS A CATALYST

The objective of this project is to undertake a consultation to evaluate an asset-based antipoverty strategy using housing as a catalyst. The Home\$ave consultation will validate the assumption that low-income individuals will respond to financial incentives to engage in a range of activities related to housing.

**CMHC Project Officer :** Julie Bernier

**CIDN :** 2498 0100001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***



## HOUSING

### SPECIAL STUDIES ON 1996 CENSUS DATA

This project is composed of developing a series of concise studies that explore the housing conditions reported in the 1996 Census of Canada. Eight studies are currently completed and available on the CMHC web site:

- Research Highlights Issue 55-1 Canadian Housing Conditions uses data primarily at the national level, explains commonly used terminology, and examines the largest groupings of households.
- Research Highlights Issue 55-2 Housing Conditions in Metropolitan Areas examines Canada's 25 Census Metropolitan Areas.
- Research Highlights Issue 55-3 Housing Conditions of Immigrants discusses the housing conditions of households whose primary maintainer is an immigrant to Canada.
- Research Highlights Issue 55-4 Housing Canada's Children examines the housing environment of Canada's children.
- Research Highlights Issue 55-5 Changes in Canadian Housing Conditions, 1991-96 examines changes in the housing conditions of non-farm, non-Native households between the 1991 and 1996 Censuses.
- Research Highlights Issue 55-6 Housing Conditions of Native Households examines the housing conditions of households defined as Native using the self-identification definition available in the Census for the first time in 1996.
- Research Highlights Issue 55-7 Canadian Households in core housing need and spending at least half their income on shelter, profiles the characteristics of these Canadian households which in 1996 constituted under 7% of the 9.8 million households studied, or about 38% of the 1.7 million households in core housing need.
- Research Highlights Issue 55-8 Seniors' Housing Conditions examines the housing conditions of households led by persons 65 years of age or older.

**CMHC Project Officer :** Ian Melzer

**CIDN :** 1988 0200003

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Research highlights are available

## HOUSING AFFORDABILITY

### ACT REGIONAL STAKEHOLDER INFORMATION SESSIONS

Ten information sessions were held across Canada to inform housing stakeholders of regulatory reform solutions that have been generated under the Affordability and Choice Today program. The intent was to encourage replication of these solutions. Stakeholders included municipalities, home builders, non-profit housing groups and other housing specialists. Forums were held in Saint John, Halifax, Quebec, Montreal, Toronto, Sudbury, Winnipeg, Saskatoon, Vancouver and Victoria.

**STATUS :** Completed

**AVAILABILITY :** There will be no product for this project

## AFFORDABLE HOUSING ADVISOR

This project will assemble an electronic database of strategies and ideas that have been successfully used to improve housing affordability. These strategies will appear under categories of activity such as: Policy and Regulation; Housing and Community Design; Construction and Technology; Operations and Management; and Redevelopment. Each strategy will be explained and illustrated with example projects. When completed, it is intended that the database will be accessible through the CMHC web site and will be fully searchable and linked to relevant sources of information of the strategies and examples. The sources will include CMHC reports, publications by other organizations and individuals and web sites of public, non-profit and non-government organizations.

**CMHC Project Officer :** Fanis Grammenos

**CIDN :** 2053 0200004

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## AFFORDABLE HOUSING IN VANCOUVER FOR PEOPLE LIVING WITH HIV/AIDS = DES LOGEMENTS ABORDABLES À VANCOUVER POUR LES PERSONNES VIVANT AVEC LE VIH/SIDA

Wings Housing Society opened the Bonaventure, an affordable housing project for persons living with HIV and AIDS, on January 21, 1999. This project took less than one year from conception to ribbon snipping. The speed at which this project was brought on stream reflects the housing crisis being faced by hundreds of Vancouver residents living with HIV disease. The Bonaventure provides housing for 57 people in roomy, affordable apartments located adjacent to some of the country's best clinical and social support services. This report chronicles the conception and implementation of the Bonaventure project and highlights the use of innovative renovation of existing historic buildings with unusually high density allowances as a way to provide affordability, choice and quality housing to some of Canada's most marginalized individuals.

*Case study written by Katherine Taylor, Options Consulting, Wings Housing Society. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2001. (Affordability and Choice Today (ACT) Demonstration Project. ACT Case Study) 35 pages*

Order number: 62340

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## REFINING OF CMHC HOUSING AFFORDABILITY INDICATORS

The purpose of this project is to undertake a study to refine CMHC housing affordability indicators.

**CMHC Project Officer :** Louis Trottier

**CIDN :** 2320 1000001

**Division :** Market Analysis Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING AND IMMIGRATION

### METROPOLIS CENTRES OF EXCELLENCE FOR RESEARCH ON IMMIGRATION ISSUES

CMHC and other federal departments provide ongoing financial support to stimulate and support policy-relevant research on immigration issues, through a network of research centres in Canadian universities. Information on Metropolis and on the almost 200 funded research projects can be found at <canada.metropolis.net>.

**CMHC Project Officer :** Jim Zamprelli

**CIDN :** 2564 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is available on the web

### STUDY ON THE RESIDENTIAL INTEGRATION OF IMMIGRANT YOUTH IN MONTRÉAL

The purpose of this project is to study and propose solutions to the problem of integrating immigrant youth in Montréal.

**CMHC Project Officer :** Kim-Anh Lam

**CIDN :** 2316 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING AND TAXATION

### TAXATION OF RESIDENTIAL PROPERTY IN CANADA

The system of taxation in Canada has become increasingly complex over the past several decades. Taxes include federal, provincial and municipal, or local, taxes. The federal government levies personal and corporate income taxes, other corporate taxes like payroll and capital taxes, a value-added tax (the Goods and Services Tax), and excise taxes. The provincial governments also collect personal and corporate income taxes, but generally follow the rules set out by the federal government. Provincial governments also levy sales taxes or participate in the federal value-added tax and collect taxes such as land transfer taxes. Local governments generally only collect property taxes and certain fees.

Many of these taxes affect the production, ownership and use of housing, and decisions surrounding these functions. This report sets out and explains tax provisions relating to housing providers, owners and renters. Section 2 presents the taxation of producers (e.g., home builders and multiple-unit residential builders.) Section 3 identifies the taxation of owners of rental housing (e.g., corporations -- both principal business corporations and not, real estate investment trusts, and individuals). Finally, section 4 discusses the taxation of the occupant individuals of owned and rented housing. Section 5 summarizes the criteria, methodology, and possible research questions that could be explored, with particular focus on the taxation of the providers of rental housing. By presenting the tax provisions by economic function, rather than by taxation type, the focus is comparisons across alternative forms that these economic activities take, as well as providing a better framework to analyze the impact of the tax provisions on housing-related economic activities.

*Prepared by Kenneth J. Klassen and Stanley N. Laiken. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Eric Tsang. Ottawa: CMHC, 2001. 66 pages*

**STATUS :** New Completed Report **AVAILABILITY :** On a loan basis from: Canadian Housing Information Centre



## ASSESSMENT OF PREFABRICATED BUILDING SYSTEMS INDUSTRY

This study will research the prefabricated building industry in Sweden and Finland.

**CMHC Project Officer :** *Louis Musto*

**CIDN :** 1979 0200002

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CANADIAN BUILDING PRODUCT DISTRIBUTION CENTRE IN SOUTHERN CHINA

This project's purpose is to conduct a detailed feasibility plan to establish a Canadian building product distribution centre in southern China.

**CMHC Project Officer :** *Marion A Rasmussen*

**CIDN :** 2174 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## CANADIAN HOUSING EXPORTERS IN THE KOREAN HOUSING MARKET

The objective of this project is to analyze the Korean housing market and to identify market potentials and opportunities for Canadian housing exporters in the Korean housing market.

**CMHC Project Officer :** *Jay Thakar*

**CIDN :** 2332 0900001

**Division :** CMHC International

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## CONTRIBUTION TO A STUDY ON PACIFIC RIM MARKETS FOR TERMITE-RESISTANT WOOD PRODUCTS

The objective of this project is to study the Pacific Rim markets for termite-resistant wood products.

**CMHC Project Officer :** *Jay Thakar*

**CIDN :** 2104 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## DEVELOPMENT OF A GUIDE TO THE UNITED KINGDOM BUILDING REGULATIONS

The objective of this project is to develop a guide on the building regulations in the United Kingdom.

**CMHC Project Officer :** *Terry Robinson*

**CIDN :** 1953 0900

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## DEVELOPMENT OF AN EXPORT TOOL-KIT FOR CHINA

This project's objective is to prepare a comprehensive assessment and collection of information pertaining to the export of Canadian housing product to China.

**CMHC Project Officer :** Murray Rasmussen

**CIDN :** 2347 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## GUIDE TO THE RULES UNDER THE NORTH AMERICAN FREE TRADE AGREEMENT AND U.S. IMMIGRATION LAW FOR CANADIAN COMPANIES IN THE HOUSING, RENOVATION AND RESIDENTIAL CONSTRUCTION SECTOR

This guide outlines the procedures as well as the criteria for those currently engaged in residential renovation, manufactured housing production, and the construction of on-site residential homes that must be met for those seeking temporary entry to the United States under the North American Free Trade Agreement (NAFTA) and U.S. immigration law. This guide is intended to provide general information about the NAFTA and U.S. immigration rules and regulations. Questions most asked by Canadian new home builders, manufacturers and renovators are included as a preamble to the guide.

*Ottawa: Canadian Home Builders' Association, Canadian Manufactured Housing Institute with the assistance of Canada Mortgage and Housing Corporation, 2000. vi, 28 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Home Builders' Association

## HOUSING MARKET GUIDES ON FOUR CITIES IN THE UNITED STATES

This project's objective is to prepare individual Market Guides for four cities in the United States: Boston, Chicago, Dallas, and Seattle.

**CMHC Project Officer :** Sanjar Farzaneh

**CIDN :** 2466 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING MARKET RESEARCH: OPPORTUNITIES FOR CANADIAN TRAINING PROGRAMS IN CHINA

The objective of this project is to research the needs and market potential of training programs in the housing sector in China, in order to respond to an emerging demand by Canadian exporters and Chinese clients.

**CMHC Project Officer :** Marion A Rasmussen

**CIDN :** 2455 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### STUDY OF THE MIDWEST BUILDING PRODUCTS MARKET IN THE REGIONS OF ILLINOIS, WISCONSIN AND MISSOURI

The purpose of this project is to undertake a study to provide Canadian companies with a general overview of the market forces within the building products sector in the three state regions of Illinois, Wisconsin, and Missouri.

**CMHC Project Officer :** Carol M Kerley

**CIDN :** 2172 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### TIPS ON THE SELLING IN THE U.S. GREEN HOUSING MARKET

Do you have a housing system or building product that reduces environmental impacts or contributes to occupant health and safety? There may be a market for you in the United States.

Housing markets in the United States are increasingly adopting a build green strategy to give consumers what they want. Canada Mortgage and Housing Corporation (CMHC) prepared this booklet to help you tap into those markets. The booklet provides a definition of green building, outlines basic steps to take to learn about the U.S. green housing market, and includes a listing of green building programs. It covers distributors and retailers, directories and product certification, conferences and events, key contacts and other marketing considerations.

Ottawa: Canada Mortgage and Housing Corporation, 2002. 36 pages

Order number: 62870

NOTE : Publié aussi en français sous le titre : Conseils pour vendre dans le marché de la construction écologique aux États-Unis

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products and on CMHC's web site

### UPDATE OF THE STUDY ON MID-ATLANTIC BUILDING MATERIALS MARKET

To support an update of the study entitled "Business Opportunities for Canadian Building Materials Manufacturers in the Mid-Atlantic Region of the U.S. of America" with new actual and forecast data.

**CMHC Project Officer :** Carol M Kerley

**CIDN :** 2228 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### USER INTERFACE FOR CD-ROM ON MARKET GUIDES TO THE U.S.

This project's objective is to design the interface for users of a CD-ROM containing market guides to the United States and to convert the files for transfer on the CD-ROM.

**CMHC Project Officer :** Louis Musto

**CIDN :** 1953 0900012

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***



## HOUSING FORECASTING AND DEMAND

### ESTIMATION OF CORE HOUSING NEED USING THE SURVEY OF HOUSEHOLD SPENDING MICROFILE

This External Research Program project is aimed at developing a methodology for tracking housing conditions and need between censuses using the latest (1999) Survey of Household Spending (SHS) file. The contractor will carry out research at Statistics Canada with the internal SHS working file to examine how to apply CMHC's indicators for housing affordability, adequacy, and suitability and the integrated indicator of core housing need to the SHS. The contractor will, in the process, identify and examine the nature of any problems associated with small SHS sample size, suggesting workarounds where possible, at the same time as evaluating the longer term potential to expand the survey sample.

**CMHC Project Officer :** John Engeland

**CIDN :** 2437 0200016

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING MARKET

### ASSESSMENTS OF EFFECTS OF GRAIN ELEVATOR CLOSURES IN SASKATCHEWAN

This project's objective is to evaluate the effects of closures (and restructuring) of grain elevators recently announced by the Saskatchewan Wheat Pool.

**CMHC Project Officer :** Gary MacDonald

**CIDN :** 2118 1000001

**Division :** Market Analysis Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ETHNIC CHANGES AND THE HOUSING MARKET IN RIVIÈRE-DES-PRAIRIES, MONTRÉAL

This project's objective is to provide an understanding of the residential building depreciation mechanism in order to find out the share of the effects of ethnicity in relation to the general economic conditions prevailing on the market in Rivière-des-Prairies, Montreal.

**CMHC Project Officer :** Philippe LeGoff

**CIDN :** 2437 0200007

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### IMPACT OF CONVERSIONS OF RENTAL TO OWNERSHIP UNITS ON HOUSING MARKETS IN ONTARIO

This study seeks to generate a framework for addressing the changes in the availability of affordable housing stock in large Ontario cities through conversions of rental units and, by extension to understand the impact of these conversions on other components of the housing market, in particular the new homes market.

**CMHC Project Officer :** Alain Miguelez

**CIDN :** 2226 1000001

**Division :** Market Analysis Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING MARKET

### INVESTOR CONDOMINIUM MARKET IN VANCOUVER, BURNABY, AND RICHMOND

The objective of this project is to undertake a detailed study of the investor condominium market in Vancouver, Burnaby, and Richmond. The study will identify the number of investor condominiums in these areas, as well as the rental rates and vacancy rates.

**CMHC Project Officer :** *Cameron Muir*

**Division :** Market Analysis Centre

**AVAILABILITY :** Product is not yet available

**CIDN :** 2283 1000001

**STATUS :** Ongoing

**\*NEW\***

### STUDY ON THE RESIDENTIAL PATH OF PEOPLE AGED 45 TO 64 YEARS IN THE MONTRÉAL AND QUÉBEC CENSUS METROPOLITAN AREAS (CMAS)

This project's objective is to provide a study on the residential path of people aged 45 to 64 years in the Montréal and Québec census metropolitan areas (CMAs).

**CMHC Project Officer :** *Sandra S Girard*

**Division :** Market Analysis Centre

**AVAILABILITY :** Product is not yet available

**CIDN :** 2293 1000001

**STATUS :** Ongoing

**\*NEW\***

### SURVEY AND LITERATURE REVIEW OF SOCIOECONOMIC TRENDS AFFECTING CONSUMERS AND HOUSING MARKETS

This research project will review what is known and what has been analyzed in regard to important existing and emerging socioeconomic trends and how they might affect consumers and housing markets over the next 5 years. The contractor will provide views regarding what needs to be researched and criteria to be applied in setting research priorities in this area.

**CMHC Project Officer :** *Ian Melzer*

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** N/A

**STATUS :** Ongoing

**\*NEW\***

## HOUSING RESEARCH

### DIRECTED RESEARCH EVALUATION REPORT

This study investigated the economic benefits of the Directed Research (DR) and related information transfer of the Canada Mortgage and Housing Corporation (CMHC). The intent was to determine whether there is a positive economic return to Canadian society from CMHC's investment in the DR. This study was commissioned in response to a Treasury Board request for a further evaluation of CMHC's research, information and communications function following a 1994 evaluation study. The 1994 evaluation concluded that DR was relevant and produced high quality and useful research. The current study builds on that earlier evaluation by seeking to quantify the benefits of CMHC's DR. It does not include analysis of other CMHC research: e.g., for market analysis and export development, or CMHC's Responsive Research Programs (the External Research Program and the Housing Awards Program).

This study used a partial benefit/cost (B/C) methodology that compared the benefits of a small number of research areas expected to have large net benefits to the total costs of CMHC DR. An iterative process was used to identify cases in which the benefits were likely to be large, the benefits

## HOUSING RESEARCH

could be quantified in dollar terms, there was a discrete set of uses and users for the research results, the impacts could be clearly attributed to use of the research results or participation in the research, and CMHC's DR had a significant role in creating the impacts. Four cases of research impacts were investigated in detail, and five other cases were also examined at the study design stage. The four cases for which net benefits were estimated were British Columbia wood-frame moisture damage, brick veneer steel studs, mandatory fire sprinklers, and northern water microsystems.

The findings indicate that CMHC's DR will likely provide significant benefits to Canada over the next several decades, and represent a positive return from CMHC's housing research.

*Prepared by KPMG Consulting LLP for Audit and Evaluation Services. Ottawa: Canada Mortgage and Housing Corporation, November 2001. 36 pages*

NOTE : Aussi disponible en français sous le titre : Rapport d'évaluation de l'activité de recherche commandée

**STATUS :** New Completed Report

**AVAILABILITY :** Product is available on the web

## MORTGAGES AND HOUSING FINANCE

### EVOLVING IMPACT OF E-COMMERCE ON HOUSING FINANCE ACCESS AND AFFORDABILITY: US EXPERIENCE AND LESSONS FOR CANADA

The objective of this research is to examine the significant changes arising in the housing finance market place resulting from e-commerce and their impact on housing finance access and housing affordability. An overview of experience to date and international comparisons with the US will be instructive to Canadian stakeholders being impacted by this growing trend. The research project will entail a literature review, Internet searches, interviews and discussions with knowledgeable US and Canadian industry participants, government regulatory agencies, housing sector stakeholders and other key informants.

**CMHC Project Officer :** Ian Melzer

**CIDN :** 2389

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PERSONS WITH DISABILITIES

### DETERMINING THE EFFORT NEEDED BY ADULTS AND SENIORS TO CLIMB RAMPS USING MANUAL WHEELCHAIRS

The objective of this research is to determine the effort needed by adults and seniors to climb ramps using manual wheelchairs.

**CMHC Project Officer :** Luis Rodriguez

**CIDN :** 2305 0200019

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



### EXAMINING THE HOUSING CHOICES OF INDIVIDUALS WITH DISABILITIES

Many individuals with disabilities are concerned about the limited types of housing options available for persons with disabilities. However, information on the living arrangements and housing preferences of individuals with disabilities is limited. To begin to understand the situation better, this exploratory survey research study examines the housing choices of persons with mobility and/or agility disabilities living in Regina. The study provides information on the current living arrangements of individuals with disabilities; determines if there are individuals who could benefit from more accessible housing; explains what the term "more accessible housing" means in Regina and develops a profile of those people who could benefit from more accessible housing.

*Prepared by Janice Solomon. This study was managed by the City of Regina with advice and assistance from the Advisory Committee on Access and the Department of Sociology and Social Studies, University of Regina. CMHC Project Officer: Thomas Parker. Ottawa: Canada Mortgage and Housing Corporation, 2002. (External Research Program Research Report) ca. 38 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### MAJOR MAINTENANCE AND RESIDENTIAL RENOVATION: A SURVEY OF MEANS TO IMPROVE THE ARCHITECTURAL ACCESSIBILITY OF EXISTING BUILDINGS

The objective of this project is to study the extent to which it is possible to integrate architectural accessibility into existing residential buildings during major maintenance or common renovation work planned by an owner.

**CMHC Project Officer :** Rachelle Luengas

**CIDN :** 2021 0200001

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### SPACE EFFICIENT UNIVERSAL DESIGN INNOVATIONS

The research will evaluate design innovations which have been developed specifically to enhance access for people who use wheelchairs.

**CMHC Project Officer :** Thomas Parker

**CIDN :** 2009 0200001

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## POPULATION HEALTH

### DEVELOPMENT OF A RESEARCH FRAMEWORK FOR POPULATION HEALTH AND HOUSING

The National Housing Research Committee is interested in the possible links between housing and health status at the population level. This project begins to address the lack of comprehensive research in the area. More specifically, it will summarize what is known using existing literature reviews, recent unreviewed literature, current work underway. Based on this, the project will: develop a theoretical framework using accepted concepts and definitions where they exist, assess the difficulties of research in this area and identify areas with most promise, assess institutional research capacity for mounting a program of research in this area, and write a research proposal, for submission to a funding body, whereby NHRC could partner.

**CMHC Project Officer :** *Phil Deacon*

**CIDN :** 2489 0600001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## REGULATORY REFORM

### OPPORTUNITIES FOR IMPROVING THE INSPECTIONS PROCESS, CITY OF VANCOUVER, BRITISH COLUMBIA = OCCASIONS D'AMÉLIORER LE PROCESSUS D'INSPECTION, VILLE DE VANCOUVER (COLOMBIE-BRITANNIQUE)

In the mid-1990s, the building regulatory process in Vancouver was identified as very complex and time consuming. Although the major duplication and red tape issues were found in the planning approval process, building inspections could also be a problem. Trade and building inspection functions were separate, data recorded in the field had to be re-recorded later, information needed on site was only available at the municipal office, and interpretation of requirements could vary from one person to another.

In 1994, the City of Vancouver started an ambitious program to fundamentally change and improve its services, an initiative it called the "Better City Government Program." Redesign of the planning and inspections process represented a central element of this program. Within the inspections area, a team was set up to re-think what the goals and functions of construction site inspections really were, and how they could best be accomplished.

The project produced benchmarking information of best practices, based on six other municipalities in Canada, the United States and Australia, plus the Workers' Compensation Board of British Columbia. The team also produced a proposed process for inspections, including flow charts that concentrated on value-added work and expanded the responsibilities of inspectors. Their "Day-in-the-Life" description emphasized site use of cell phones, laptop computers and modems. They also produced a business case, with plans for implementation and cost recovery. Through an assessment of field technologies, field staff isolated pros and cons of different computerized systems and produced practical criteria for judging equipment in the future.

Actual implementation has been delayed by a rethinking of the reorganization of the planning and permitting process. Many elements were also put on hold pending decisions on a major new computerization of Vancouver's overall geographic and permitting functions. However, the project has produced a body of information which leaves the inspections department well positioned to pursue change when those two initiatives are completed. Also, a new "team approach" has been instituted for complex new projects and renovations. So far, the main results have been in speeding up development approvals.

## REGULATORY REFORM

Prepared by Rowena E. Moyes. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2001. (Affordability and Choice Today ACT Regulatory Reform Project; ACT Case Study) 31 pages

Order number: 62326

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## RENOVATION AND INSPECTION

### HISTORY OF CANADA'S RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP)

The Residential Rehabilitation Assistance Program (RRAP) was announced by the Government of Canada in the spring of 1973 and became operational the following year. It came about because of the dual recognition that the existing housing stock represented an important national asset that needed to be preserved, and that a significant portion of this stock was substandard and occupied by households unable to afford necessary repairs. Over the following 26 years, more than 600 000 dwellings, mostly comprised of self-contained homeowner and rental units, but also a good number of beds in hostels, dormitories, special care facilities and rooming houses, were repaired with RRAP assistance across all regions and areas of the country. During this time, RRAP demonstrated great versatility in adapting to the priorities of the day in achieving a broad range of public objectives from improving the housing conditions of low-income Canadians, neighbourhood improvement and employment generation, to meeting the special needs of persons with disabilities and the homeless.

This history is divided into two main parts. The first recounts the evolution of RRAP from its inception to the present day. The second part explores the evolution of critical aspects of RRAP related to need, its design, management and accomplishments, and concludes with an epilogue which reviews reasons for RRAP's durability and explores the need for targeted housing rehabilitation programs in the future.

*Prepared by Dale Falkenhagen for Canada Mortgage and Housing Corporation. CMHC Project Officer: Brian Davidson. Ottawa: CMHC, December 2001. xviii, 196 pages*

Note : Aussi disponible en français sous le titre : Histoire du Programme d'aide à la remise en état des logements (PAREL) du Canada

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### RENTAL, ROOMING HOUSE AND NON-RESIDENTIAL CONVERSION COMPONENTS OF THE RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP PHASE I)

This project's objective is to evaluate the rental, rooming house and nonresidential conversion components of the Residential Rehabilitation Assistance Program to assess the rationale for and impacts of these program components from 1995 to 2000 inclusive.

**CMHC Project Officer :** Connie Wilson

**Division :** Audit and Program Evaluation Services

**AVAILABILITY :** Product is not yet available

**CIDN :** 2785 0500001

**STATUS :** Ongoing

**\*NEW\***



## RENOVATION AND INSPECTION

### UNDERSTANDING THE MOTIVATIONS OF HOMEOWNERS TO CONVERT THEIR BUNGALOWS IN QUÉBEC CITY SUBURBS

This research will study the motivations that bring homeowners in Québec City suburbs to convert their bungalows. The objectives of this research are to clarify the decision-making process associated with the home conversion projects so as to subsequently develop a theoretical conceptual model apt to describe household behaviour.

**CMHC Project Officer :** Pascal Yvan Pelletier

**CIDN :** 2437 0200021

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RENTAL HOUSING

### ASSESSMENT REPORT ON RENTAL HOUSING TAXATION IN CANADA

The objective of this project is to write an assessment report on rental housing taxation in Canada which will identify all rental housing and related tax provisions; explain how each of these rental housing and related tax operates, including the use of illustrative numerical examples in each and every case; and discuss the generally-accepted criteria and a feasible methodology for determining the appropriateness of the current taxation regime applicable to rental housing.

**CMHC Project Officer :** Eric Tsang

**CIDN :** 2405 0100002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ETHICAL AND SOCIAL FUND INVESTMENTS IN LOWER-TO-MODERATE INCOME AFFORDABLE RENTAL HOUSING IN CANADA: AN ASSESSMENT

This study assesses the feasibility of encouraging equity investment in affordable lower-to-moderate income rental housing (ARH) in Canada, within the framework of a public-private partnership (PPP) model, via ethical or socially responsible investment (SRI) funds and pension funds. The study examines the U.S. model for ARH PPP arrangements, with particular emphasis on the features that relate to equity investment. The structure of the ethical investment industries in both the U.S. and Canada are examined in detail. A number of specific reviews of fund investment structures in the U.S. are undertaken, and the results of a survey of funds in Canada are presented. The regulatory/legislative and investment environments in Canada are assessed. The study explores a number of options for structuring equity investments for ethical funds in Canada. The primary conclusion of the study is that such investments are conceptually feasible but that both the U.S. and Canada have a long way to go in developing the investment framework and incentive structure to facilitate such investments.

*Prepared by Alex S. MacNevin. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Lisa Daher. Ottawa: CMHC, 2002. (External Research Program Research Report) 134 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### INTERVENTIONS FOR ROOMING HOUSES, SROS AND TENANTS: FINAL REPORT

Outside of social housing, rooming houses and single room occupancy (SRO) units are the least expensive form of permanent housing, and essential for very low-income single people. The CMHC study, *Regulatory Factors in the Retention and Expansion of Rooming House Stock (2000)* provided information on a number of strategies to stabilize the rooming house stock, which is under constant threat from a variety of forces.

This study looked at other approaches to conserving rooming house and SRO stock and stabilizing tenancies. A range of initiatives was addressed in seven case studies involving:

- conflict reduction;
- public education;
- community development;
- building construction; and
- supportive housing.

*Prepared by The Starr Group Inc. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, December 2001. 93 pages*

NOTE: No. 102 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

### NON-PAYMENT OF RENTS AND THE HEALTH OF THE RENTAL SECTOR IN QUEBEC

This research will measure the extent and spatial distribution of the non-payment of rents in Quebec and its economic impact on the rental sector; identify the socio-economic and demographic factors that could explain the growth of this phenomenon as observed in the number of actions brought by landlords; analyze the regulations governing the processing of recovery-termination cases in view of improving the current procedures at the Régie du logement.

**CMHC Project Officer :** Charles Fortin

**CIDN :** 2305 0200018

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ONLINE RESIDENTIAL RENTAL GUIDE

This project's objective is to undertake research and produce content for an online residential rental guide. This guide is intended to provide comprehensive advice to tenants, landlords and rental property managers regarding rights, responsibilities and best practices. It will include checklists, worksheets, and sample forms and letters, with guidance as to geographically appropriate variants. It will also provide links to other web sites and contact information.

**CMHC Project Officer :** Ian Melzer

**CIDN :** 2507 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## RENTAL HOUSING

### REPAIR NEEDS ASSESSMENT OF RENTAL HOUSING IN THE CITY OF MISSISSAUGA

The purpose of this project is to carry out a study to examine the state of repair needs of rental buildings in Mississauga.

**CMHC Project Officer :** Greg Goy

**CIDN :** 2524 0600001

**Division :** Market Analysis Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## RESIDENTIAL DEVELOPMENT

### COMMUNITY DESIGN: AN ANALYSIS OF DENSITY MEANINGS AND DEVELOPMENT OF A DESIGN TOOL

The study will address how Land Use Density (LUD) stipulations can impact and/or interplay with the various other system components of community plan-making, e.g. open space, schools, retail, etc. The project will provide an electronic template or guideline for a web based density visualization methodology by which individuals, groups, community associations, planning design professionals and institutions might engage in constructive dialogue in regards the selection of appropriate built forms for various densities in various planning situations.

**CMHC Project Officer :** Doug Pollard

**CIDN :** 1998 0200001

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### RESIDENTIAL DEVELOPMENT IN COASTAL COMMUNITIES: ADDRESSING CLIMATE CHANGE THROUGH SUSTAINABLE COASTAL PLANNING

The objectives of this project are: to understand the relationship between coastal development, climate change and sea level rise; determine the policy and planning context, and stakeholder understanding of climate change and the impact of sea level rise on coastal residential development, in a local case study; and to recommend new development guidelines for coastal residential development to adapt to climate change and sea level rise.

**CMHC Project Officer :** Brian Eames

**CIDN :** 2437 0200012

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## SENIORS

### ÉTUDE DE L'ORIENTATION SPATIALE DANS LES COMPLEXES RÉSIDENTIELS POUR PERSONNES ÂGÉES PRÉSENTANT OU NON DES TROUBLES COGNITIFS

Dementia, with a prevalence of 8% among Canadians aged 65 years and over, diminishes people's ability to find the places where they want to go and consequently limits them on the use of their residential environment. Older people who have dementia are likely to share residential spaces with those who do not, which form the majority. This situation turns out to be problematic with



respect to architectural design. The goal of this descriptive and exploratory study is to generate design criteria to facilitate wayfinding for elderly people living in mixed residences, that is, buildings dedicated both to individuals with and without cognitive problems. Qualitative and quantitative data were obtained on the sites of three urban residences that represent variable degrees of socio-economic affluence. They were drawn from interviews with staff and with residents affected by cognitive problems, and from observing the wayfinding behaviors of selected residents. The results emphasize the devastating impacts of impaired wayfinding abilities on the residents' quality of life. The most problematic situations involved searching for one's own apartment and confusion between floors. These raise concerns over the effects of using repetitive floor layouts, and the absence of architectural landmarks and appropriate signage. To be effective, circulation systems must be clear and well organized. Practical interventions with respect to architecture, wayfinding information, and human environment are suggested, thereby initiating a reflection on the future of residential environments for older people.

Prepared by Romedi Passini ... and others. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2002 printing. (External Research Program Research Report) 66 pages

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## EVALUATION OF OPTIMAL BATH GRAB BAR PLACEMENT FOR SENIORS

This project's objective is to assess different locations and configurations of bathtub grab bars and to identify the safest and most useful options to help independent seniors living in their home to maintain their independence and avoid falls.

**CMHC Project Officer :** Luis Rodriguez

**CIDN :** 2305 0200021

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## LIFE LEASE HOUSING: CONSUMER DREAM OR CONSUMER NIGHTMARE?

The objective of this research is to answer the question, what form of regulation would protect consumers while not overregulating the industry?

**CMHC Project Officer :** Luis Rodriguez

**CIDN :** 2437 0200009

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## LIFE LEASE OWNERSHIP BY THE ELDERLY OF SUITES WITH CONTINUING CARE SERVICES

The objective of this research is to gather and document the views and preferences of prospective elderly residents for two distinct types of accommodation models. One model being a combination of life leases and support services in a home like environment, and the other a traditional long term care facility. The analysis will be done both before and after occupancy.

**CMHC Project Officer :** Luis Rodriguez

**CIDN :** 2437 0200002

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## SEMINARS ON SENIORS' HOUSING TO THE RESIDENTIAL CONSTRUCTION AND HEALTH CARE SECTORS

This project's objective is to develop and undertake delivery of seminars on seniors' housing to professionals in the Canadian residential and home care sectors. The project was developed to share the results of CMHC's research, programs and other relevant information concerning seniors' housing options.

Included in this project is the development of eight separate modules on different aspects of seniors' housing. To date 27 presentations have been delivered at 20 events. Preliminary evaluation results indicate a very high degree of satisfaction with the seminars and they will continue in 2002 with a focus on the health care industry, architects and home builders.

**CMHC Project Officer :** Jim Zamprelli

**CIDN :** 2382 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## TOGETHER INDEPENDENTLY: A HOUSING CONCEPT TO AID THE COMMUNITY INTEGRATION OF SENIORS AND DISABLED ADULTS = ENSEMBLE MAIS AUTONOMES : UN CONCEPT DE LOGEMENT QUI FAVORISE L'INTÉGRATION DES AÎNÉS ET DES ADULTES HANDICAPÉS DANS LA COLLECTIVITÉ

In Shediac, N.B., Alphonse LeGresley conceived and built a unique house that addressed a genuine Canadian housing need. Unfortunately, the Moncton area civil engineer could not persuade anyone to live in his house.

Mr. LeGresley's concept, called "Together Independently", was a duplex-style dwelling in which the occupants of each half shared certain facilities but would otherwise live as if they occupied self-contained units. They would share a kitchen with two fridges, the metered electrical system, the water and sewer systems, the heating system, and could share a central vacuum system.

The clientele for whom he designed the house were seniors and disabled adults, able to live independently with someone nearby they could call on if they took sick or needed help with chores such as housework or shopping. Basically, his house would be occupied by a primary tenant/owner and another tenant willing to act as a companion and helper to the primary occupant. They would share certain living costs, making this an economical arrangement for both.

The project proceeded in three distinct phases. Mr. LeGresley explained his concept to groups representing seniors and the disabled, got their input and adjusted his design to accommodate needs. He explained his plan to municipal officials and obtained the single dwelling designation he sought because it was key to the project's economic viability. Then he secured financing and built the house.

He held an open house that attracted considerable local media attention to the model. He advertised the house and promoted it directly to organizations interested in the needs of seniors and disabled persons. There was interest, but no one wanted to buy or rent the house. In late 1998, he decided to cut his losses and convert the dwelling to a true duplex. In early 1999, the make over was done and the two units were available for rent.

This report describes Mr. LeGresley's concept and suggests reasons why it did not succeed. Left unanswered is the question, "Would it work elsewhere or under different circumstances?"

*Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada*

## SENIORS

Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999 c.2001. (Affordability and Choice Today ACT Regulatory Reform Project; ACT Case Study) 37 pages

Order number: 62228

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## SOCIAL HOUSING

### CANADIAN CENTRE FOR PUBLIC-PRIVATE PARTNERSHIPS: SURVEY OF PROJECT CLIENTELES

The purpose of this project is to produce statistical tabulations of the Canadian Centre for Public-Private Partnerships: Survey of project clienteles and conduct statistical tests of significance as specified in the statement of work.

**CMHC Project Officer :** Patricia Streich

**Division :** Audit and Program Evaluation Services

**AVAILABILITY :** Product is not yet available

**CIDN :** 2452 1500001

**STATUS :** Ongoing

**\*NEW\***

### EVALUATION STUDY OF THE SHELTER ENHANCEMENT PROGRAM: SEP

The objective of this project is to complete an evaluation of the Shelter Enhancement Program.

**CMHC Project Officer :** Patricia Streich

**Division :** Audit and Program Evaluation Services

**AVAILABILITY :** Product is not yet available

**CIDN :** 2258 0500002

**STATUS :** Ongoing

## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

### IMPACT OF HOUSING CHOICES: CONSUMER INFORMATION ON SUSTAINABLE COMMUNITY PLANNING

The purpose of this project is to develop a consumer-oriented information product comparing the impact of various housing choice scenarios, each with different community planning patterns. Users of this web based product will be able to select among ten Canadian cities. In each city, five typical neighbourhood development patterns and locations within the urban context will be described, highlighting issues such as private vehicle use, access to daily destinations and availability of private space.

**CMHC Project Officer :** Susan Fisher

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2280 0200001

**STATUS :** Ongoing



## LANDSCAPE DESIGN AND MAINTENANCE FOR CANADIAN HOMES

The purpose is to develop an updated advisory document on landscape design, construction and maintenance for Canadian homes. CMHC's last advisory document of this nature, entitled Landscape Architectural Design and Maintenance, was published in 1982. While it offers many practical tips and tools which should be emulated, the update will be more oriented toward a consumer audience, place more emphasis on sustainability and build on recent CMHC research in this area. The document will be completed in 2002 and will be of interest to consumers, landscape architects and the landscape industry.

**CMHC Project Officer :** Susan Fisher

**CIDN :** 2229 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PHASE III - DEVELOPMENT OF A SUSTAINABLE COMMUNITY DESIGN CHARRETTE FOR SOUTH EAST FALSE CREEK, VANCOUVER

This project's objective is to cosponsor a design charrette related to the area of Vancouver known as South East False Creek. The City of Vancouver will develop a generic sustainable community design charrette handbook to help guide further community planning and design efforts.

The handbook will provide a brief overview of sustainable community design charrettes, their purpose, goals and benefits and give guidance on how to decide whether a charrette is appropriate. Topics cover will include, organizational information, communications, logistics, material requirements, time and timing, products, choreography, facilitation, costs etc. The handbook will feature examples of past charrettes, primarily the South East False Creek charrette in Vancouver.

**CMHC Project Officer :** Doug Pollard

**CIDN :** 2307 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## SUSTAINABLE COMMUNITY PLANNING AND DEVELOPMENT: DESIGN CHARRETTE PLANNING GUIDE: FINAL REPORT

Design charrettes are becoming increasingly popular as a way to bring a range of expertise and interests together to collaborate on creating innovative design solutions and embody multiple objectives and mutual interests. They give visual form to ideas and policies and can be used to test and refine planning and development policies and directions. Overall, they are a means to obtain the most creative proposals for addressing the most difficult problems in the least amount of time.

This manual is intended as a guide for those who would like to host or otherwise initiate a design charrette process for sustainable community planning. It is directed particularly at the urban planning context but has application to other planning contexts as well.

The opening chapter begins with an introduction to the concepts and elements of sustainable development and 'sustainable community', and the role of design. Design charrettes and charrette-like events are then explored in more detail in terms of their purposes, usefulness and contribution to policy development and community planning. The chapter is intended to provide foundational information regarding sustainability planning, and guidance for deciding how a design charrette can be useful in your local community. The next chapter outlines key issues and steps involved in confirming a 'go ahead' for hosting or otherwise becoming involved with a charrette.

## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

This section examines the decision-making context, allies and resources, ways of building support and promoting the plan, and getting formal approvals. "Readiness Assessments" help you determine whether or not you are ready to proceed and what to do next in accordance with your answers.

Chapter 3, Pre-Charrette Planning: Roll up Your Sleeves, is focused on the host of tasks to be completed in advance of a charrette. It includes sections on the stakeholder community and communications; consultants and facilitators; advance meetings and options; design issues including detailed discussion on the development of the design brief; design team formation and participant selection; time and timing; venue and facilities; support materials; and additional logistics. Sample schedules, products and lists are provided.

The final chapters focus on the choreography, management and documentation of the charrette itself. Guidance and coaching hints for handling all the products of the charrette along with post-charrette communications and presentations is contained in the final chapter.

*Prepared for Ian Smith, Planning Department, City of Vancouver and Douglas Pollard, Research Division, Canada Mortgage and Housing Corporation by Fiona S. Crofton, Principal, ORCAD Consulting Group Inc. Ottawa: CMHC, November 2001. 130 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## SUSTAINABLE INTEGRATION OF INFRASTRUCTURE AND BUILDINGS IN MAASTRICHT, THE NETHERLANDS

This project's objective is to conduct and report upon a workshop entitled 'Sustainable Integration of Infrastructure and Buildings in Maastricht, The Netherlands. The project will develop a report which includes the proceedings of a two day discussion and design exercise where European and Canadian experts explore the potential of green buildings to perform as community infrastructure. The report will also include a brief analysis of where Canadian design expertise in this field might find a market niche in European design markets.

**CMHC Project Officer :** Doug Pollard

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2310 0200001

**STATUS :** Ongoing

## TESTING CONSUMER RECEPTIVITY TO SUSTAINABLE COMMUNITY DESIGN FOR A DEMONSTRATION-BUILD SITE IN OKOTOKS, ALBERTA

CMHC contribution to develop a computer-based visualization tool that will illustrate and describe the features of a 144-acre demonstration project that adopts sustainable community principles and planning criteria.

**CMHC Project Officer :** Susan Fisher

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2363 0200001

**STATUS :** Ongoing

## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

### THEORY TO PRACTICE: LESSONS LEARNED FROM THE USE OF PERFORMANCE ASSESSMENT MEASURES TO IMPLEMENT SUSTAINABLE COMMUNITIES: FINAL REPORT

This report provides a review of the lessons learned from practitioners engaged in the development and use of performance assessment measures (PAMs) for sustainable community development through the development of case studies. A PAM involves the use of an indicator and target for achieving a certain desired future state of affairs with respect to promoting the features of sustainable community development. The process of developing and utilizing PAMs is fundamentally important in moving from broad sustainable community visions, goals and objectives to the implementation of specific measures that yield progress. PAMs are a tool for operationalizing sustainable development in a manner that reflects local circumstances. PAMs are used for a wide variety of purposes including public education, internal program and policy review and development, staff and political communications, and relations with the development community to name a few. The establishment of PAMs within an overall sustainable community development and reporting process can be challenging and the report points to a number of methods of establishing an effective program.

*Prepared by Steven W. Peck and Ray Tomalty. CMHC Project Officer: Doug Pollard. Ottawa: Canada Mortgage and Housing Corporation, 2002. (External Research Program Research Report) ca. 80 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## WOMEN AND HOUSING

### HOUSING OPTIONS FOR RURAL WOMEN LIVING ALONE

This project's objectives are: to identify the unique housing requirements of women living alone in rural areas, the housing options that would meet these requirements, changes required to planning practices and land use regulations that would allow the housing sector to respond to the unique housing requirements of women living alone while respecting the density issues, environmental issues and other factors essential for the preservation of the rural character of life.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2437 0200004

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## YOUTH AND HOUSING

### HOW TALOYOAK, NUNAVUT TERRITORY CREATED AFFORDABLE HOUSING FOR YOUTH THROUGH FUNDING PARTNERSHIPS AND THE LESSONS LEARNED = COMMENT TALOYOAK, DANS LE TERRITOIRE DU NUNAVUT, A PRODUIT DES LOGEMENTS ABORDABLES POUR LES JEUNES GRÂCE À DES PARTENARIATS DE FINANCEMENT, ET LES LEÇONS QUE LA COLLECTIVITÉ A TIRÉES DE SON EXPÉRIENCE

Unlike most parts of Canada, where housing an aging population is a pressing public issue, the civic administration of the Spence Bay Hamlet of Taloyoak, Nunavut Territory, is concerned with the



housing needs of youth. In 1996, 42 per cent of the population was aged 14 and under, compared to 13 per cent aged 45 and over. A lack of suitable housing for young adults forces many working youth to live with their parents or grandparents in overcrowded conditions.

To meet the housing needs of youth, the municipality built a 12-unit housing project on land its development corporation leased from the municipality. The project can serve as a model which other northern communities facing similar problems could emulate. The \$7,000 awarded to the Hamlet under the A.C.T. program helped document and promote the project for the benefit of other northern communities. This A.C.T. report is particularly instructive in its description of the funding sources Taloyoak tapped to pay for it all and the various difficulties encountered along the way.

*Case study written by Louis Primeau, Hamlet of Taloyoak, Nunavut Territory. Edited by Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2001. (Affordability and Choice Today ACT Case Study) 28 pages*

Order number: 62328

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

### LOGEMENT INNOVATEUR POUR JEUNES PERSONNES SANS ABRI: RAPPORT FINAL

This research is aimed at identifying innovative housing projects intended to meet the needs of homeless youth and the factors that make them exemplary projects, based on two main sources of information – a review of the literature and interviews with key people working in this sector.

The needs of homeless youth documented in the literature are extensive and complex. There are often major deficiencies in terms of training and preparation for the job market; emotional and relationship problems frequently result from a difficult life; and surviving as a homeless person may have led to health and substance abuse problems. In addition, it would seem that these youth often have mental health problems.

Recent studies highlight the determining role of housing as a solution to the problems of homelessness. However, while a stable home may be very important, it is clear that, for certain subgroups including youth, support services are necessary. An analysis of effective models for youth reveals the following elements: a safe and affordable home, constant emotional support, a relationship with at least one responsible and trustworthy adult, the opportunity to develop life skills leading to autonomy, and access to services such as training, education, an employment readiness course, and health care including mental health. The studies also show the need for social ties. Participation and control issues were often raised. Examples of projects that encourage participation in project design were collected.

*Prepared by Luba Serge. Ottawa: Canada Mortgage and Housing Corporation, 2002. (CMHC External Research Program Report) 57 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### RESIDENTIAL INTEGRATION OF YOUNG MIGRANTS IN QUEBEC

This study concerns the residential integration process of young migrants in Quebec. Residential integration is defined as a process that begins even before young people leave their parents' home and that continues until they are relatively stable in a dwelling; this stability often, but not necessarily, corresponds to the formation of a family unit.

**CMHC Project Officer :** *Leanne Elliott*

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2305 0200005

**STATUS :** Ongoing

## BIBLIOGRAPHIES

Adjustable Rate Mortgages / Prêts hypothécaires à taux flottant

(Rev. 18p., October/octobre 1991)

Building in cold climates / Construction dans les pays froids

(Rev. 9p., December/décembre 1989)

Children in the urban environment / Les enfants dans le milieu urbain

(23 p., January/janvier 1993)

CMHC Scholarship Program: A Bibliography 1947 - 1993 / Le Programme de bourses d'études de la SCHL : une bibliographie 1947 - 1993

(66 p., 1994)

Cohousing / Habitation communautaire

(8p., July/juillet 1996)

Congregate housing / Habitat collectif

(10 p., November/novembre 1991)

Construction industry in Canada / Industrie de la construction au Canada

(Rev. 27 p., January/janvier 1988)

Cooperative housing / Coopératives de logements

(Rev. 40 p., September/septembre 1988)

Crime prevention and architectural design / Design architectural et prévention de la criminalité

(7 p., May/mai 1989)

Crime prevention and urban safety in residential environments / La prévention du crime et la sécurité dans les milieux résidentiels urbains

(12p., September/septembre 1989)

Discrimination and segregation in housing in Canada / Bibliographie sur la discrimination et la ségrégation dans le logement au Canada

(5p., March/mars 1993)

Downtown redevelopment / Réaménagement de centres-villes

(Rev. 26p., January/janvier 1989)

Earthquakes and construction / Tremblements de terre et construction

(20 p., March/mars 1995)

\*External Research Program Reports arranged by subject / Rapports du programme de recherche à l'extérieur par sujet

(Rev. 70 p., November/novembre 2001)

Floating Homes and Houseboats / Maisons-bateaux et Bateaux-maisons

(15 p., August/août 1997)

Foundations / Fondations

(17p., January/janvier 1989)

Graduated payment mortgages / Prêts hypothécaires à paiements progressifs

(Rev.3p., October/octobre 1991)

Home equity conversion / Conversion de la valeur nette du logement

(9p., October/octobre 1988)

Home ownership / La propriété d'un logement

(Rev. 28p., August/août 1987)

Homelessness / Sans-logis

(Rev. 61p., June/juin 1998)



- Housing and AIDS / Hébergement des personnes atteintes du SIDA  
(5 p., September/septembre 1993)
- Housing and services for the disabled / Logement et les services pour les handicapés  
(Rev. 68 p., April/avril 1992)
- Housing conversion and residential intensification / Conversion d'habitations et intensification résidentielle  
(Rev. 8 p., October/octobre 1990)
- Housing demand / La demande en logement  
(22 p., November/novembre 1986)
- Housing for immigrants and minorities / Logement pour les groupes ethniques et immigrants  
(7 p., May/mai 1993)
- Housing for single people / Le logement et les personnes seules  
(7 p., October/octobre 1992)
- Housing in Canadian municipalities / Logement dans les municipalités canadiennes  
(Rev. 44 p., March/mars 1985)
- Housing in urban core areas / Logement dans les centres-villes  
(Rev. 13 p., January/janvier 1985)
- Housing management / Gestion des logements  
(Rev. 23 p., January/janvier 1989)
- Housing markets / Le marché du logement  
(Rev. 36 p., January/janvier 1988)
- Housing policy in Canada / Politique du logement au Canada  
(Rev. 45 p., January/janvier 1987)
- Housing quality / Qualité de logement  
(8 p., January/janvier 1988)
- Housing renovation / Restauration de quartiers résidentiels  
(Rev. 62 p., March/mars 1988)
- Housing subsidies / Subventions au logement  
(Rev. 49 p., October/octobre 1990)
- Impact of inflation on house prices / Effets de l'inflation sur le prix des maisons  
(Rev. 5 p., February/février 1995)
- Indoor air pollution / Pollution de l'air des habitations  
(Rev. 29 p., July/juillet 1990)
- Infill housing / Logement résidentiel complémentaire  
(Rev. 8 p., March/mars 1990)
- Insulation / Isolement  
(Rev. 33 p., November/novembre 1991)
- Land banks and land trusts / Banques agraires et sociétés foncières  
(15 p., November/novembre 1990)
- Life cycle costing / Estimations du coût global  
(Rev. 9 p., November/novembre 1992)
- Lofts / Lofts  
(6 p., July/juillet 1996)

- Log structures / Constructions en pièce sur pièce  
(Rev. 8 p., April/avril 1989)
- Low cost affordable housing / Habitation à coût modique  
(Rev. 35 p., October/octobre 1989)
- Manufactured housing / Habitation préfabriquée  
(Rev. 33 p., November/novembre 1986)
- Moisture problems in buildings / Humidité dans les constructions  
(Rev. 21 p., July/juillet 1990)
- Mortgage-backed securities / Titres hypothécaires  
(13 p., March/mars 1988)
- Mortgage insurance / L'assurance hypothécaire  
(11 p., April/avril 1988)
- Mortgages / Hypothèques  
(Rev. 21 p., August/août 1984)
- Native housing / Logement pour autochtones  
(42 p., January/janvier 1996)
- Noise / Le bruit  
(30 p., December/décembre 1991)
- Non-profit housing / Le logement à but non-lucratif  
(Rev. 19 p., October/octobre 1989)
- Playgrounds / Terrains de jeux  
(Rev. 30 p., December/décembre 1991)
- Post occupancy evaluation / Évaluation après occupation  
(13 p., February/février 1989)
- Public housing in Canada / Habitations à loyer modéré au Canada  
(Rev. 63p., September/septembre 1991)
- Public housing in Great Britain / Habitations à loyer modéré au Grande-Bretagne  
(17p., September/septembre 1988)
- Public/Private Partnerships / Association du secteur public et du secteur privé  
(13 p., December/décembre 1989)
- Radon and houses / Radon dans les habitations  
(Rev. 23 p., July/juillet 1990)
- Real estate in Canada / Propriété immobilière au Canada  
(Rev. 37 p., September/septembre 1987)
- Rent control / Contrôle des loyers  
(Rev. 20 p., August/août 1990)
- \*Rental housing / Logement locatif  
(111 p., September/septembre 2000)
- Residential development / Développement résidentiel  
(Rev. 57 p., July/juillet 1991)
- Residential displacement, relocation, and gentrification / Relogement, relocalisation, et embourgeoisement  
(19 p., September/septembre 1988)

- Residential Rehabilitation Assistance Program / Programme d'aide à la remise en état des logements  
(8 p., February/février 1988)
- Resource communities / Villes d'exploitation de ressources  
(Rev. 15 p., March/mars 1988)
- Retirement and life care communities / Collectivités de retraités et communautés fournissant des soins à vie  
(Rev. 10 p., March/mars 1990)
- Rural housing / Logement rural  
(Rev. 18 p., March/mars 1988)
- Secondary mortgage markets / Marchés hypothécaires secondaires  
(6 p., August/août 1982)
- Self-help housing / Autoconstruction  
(Rev. 13 p., January/janvier 1989)
- Seniors housing / Le logement et les personnes âgées  
(Rev. 146 p., October/octobre 2000)
- Shared housing / Logement à contrepartie de travaux  
(Rev. 11 p., October/octobre 1994)
- Solar access rights / Droit au soleil  
(Rev. 8 p., October/octobre 1992)
- Solar heating / Chauffage solaire  
(Rev. 16 p., October/octobre 1992)
- Solar houses / Maisons solaires  
(Rev. 22 p., October/octobre 1992)
- Stackwall and cordwood house construction / Construction de maisons de «bois cordé»  
(Rev. 2 p., December/décembre 1992)
- \*Straw bale housing / Maisons de ballots de paille et mortier  
(Rev. 14 p., December/décembre 2001)
- Student housing / Logement pour les étudiants  
(Rev. 6 p., July/juillet 1989)
- Temporary shelter for battered women / L'hébergement temporaire pour les femmes victimes de violence  
(Rev. 11 p., May/mai 1991)
- Total Quality Management/Qualité totale  
(17p., July/juillet 1996)
- Underground housing / Maisons souterraines  
(Rev. 31 p., October/octobre 1992)
- Urban Infrastructure in Canada / L'infrastructure urbaine au Canada  
(62 p., April/avril 1989)
- Vacation homes / Chalets  
(29 p., November/novembre 1991)
- Variable-rate mortgages / Les prêts hypothécaires à taux variable  
(Rev. 9p., October/octobre 1991)



## BIBLIOGRAPHIES

Ventilation / Ventilation

(Rev. 26 p., September/septembre 1991)

Wind pressure and buildings / Les pressions exercées par le vent sur les bâtiments

(Rev. 13 p., November/novembre 1990)

Women and housing / Les femmes et le logement

(15 p., April/avril 1991)

Wood construction / Construction en bois

(Rev. 21 p., August/août 1987)

Youth and Housing / Les jeunes et le logement

(20 p., November/novembre 1998)

## TITLE INDEX

- 2001 COOPERATIVE HOUSING SURVEY, 64
- ABORIGINAL HOUSING: LOCAL DESIGN AND MATERIAL, 7
- ACT REGIONAL STAKEHOLDER INFORMATION SESSIONS, 72
- ADAPTATION OF POTENTIAL HOUSING DEMAND MODEL TO ABORIGINAL COMMUNITIES - AN EXAMPLE, 59
- AFFORDABLE HOUSING ADVISOR, 73
- AFFORDABLE HOUSING IN VANCOUVER FOR PEOPLE LIVING WITH HIV/AIDS = DES LOGEMENTS ABORDABLES À VANCOUVER POUR LES PERSONNES VIVANT AVEC LE VIH/SIDA, 73
- ALTERNATE ABORIGINAL TRAINING DELIVERY OPTIONS, 60
- ALTERNATIVE HOME ENERGY SOURCES FOR THE NORTH, 14
- ALTERNATIVE WALL SYSTEMS FOR LOW-RISE RESIDENTIAL CONSTRUCTION, 32
- ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS, 15
- ANALYTICAL MODEL OF EARTH TUBE VENTILATION SYSTEMS, 20
- APPLICABILITY OF A CONTINUUM OF CARE MODEL TO ADDRESS HOMELESSNESS, 66
- ASSESSING THE PARAMETERS FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS, 20
- ASSESSMENT AND ALTERNATIVE APPROACHES FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS, 20
- ASSESSMENT OF PREFABRICATED BUILDING SYSTEMS INDUSTRY, 75
- ASSESSMENT REPORT ON RENTAL HOUSING TAXATION IN CANADA, 84
- ASSESSMENTS OF EFFECTS OF GRAIN ELEVATOR CLOSURES IN SASKATCHEWAN, 78
- BEST PRACTICE GUIDE - FIRE AND SOUND ASSEMBLIES FOR MULTI-FAMILY BUILDINGS, 23
- BEST PRACTICE GUIDE - WOOD FRAME ENVELOPES IN COASTAL CLIMATES OF BRITISH COLUMBIA, 24
- BEST PRACTICE GUIDE FOR CURTAIN WALLS, 24
- BEST PRACTICE GUIDE FOR EXTERIOR INSULATED FINISHED SYSTEMS (EIFS), 24
- BEST PRACTICE GUIDE FOR PRE-CAST CONCRETE WALLS, 12
- BETTER BUILDING GUIDE TO INNOVATION IN THE DESIGN AND CONSTRUCTION OF HIGH-RISE RESIDENTIAL BUILDINGS, 25
- BONHEUR DU BON AIR - ALONG WITH THE DRAFTING OF AN ACCOMPANYING BOOKLET, 37
- BRITISH COLUMBIA HIGH-RISE ENVELOPE DETAILS STUDY, 25
- BUILDING ENVELOPE SOLUTIONS - THEORY AND PRACTICE, 33
- BUILDING RATING AND LABELING SYSTEMS, 25
- CAN/CSA F326-M91 (R1998), RESIDENTIAL MECHANICAL VENTILATION SYSTEMS, 21

## TITLE INDEX

CANADIAN BUILDING PRODUCT DISTRIBUTION CENTRE IN SOUTHERN CHINA, 75

CANADIAN CENTRE FOR PUBLIC-PRIVATE PARTNERSHIPS: SURVEY OF PROJECT CLIENTELES, 89

CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS NATIONAL INITIATIVE - PHASE II, 49

CANADIAN HOUSING EXPORTERS IN THE KOREAN HOUSING MARKET, 75

CASE STUDIES OF MAJOR HOME ENERGY RETROFITS, 15

CASE STUDIES OF WATER CONSERVATION INITIATIVES IN MULTIS, 53

CAUSES AND CONDITIONS CONTRIBUTING TO FAMILY HOMELESSNESS AND APPROACHES TO ADDRESSING FAMILY HOMELESSNESS, 66

CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS, 21

CHARACTERIZATION OF ENERGY AND WATER END-USE LOAD PROFILES IN HOUSING: LITERATURE REVIEW, 15

CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA, 26

CLEANING UP YOUR HOUSE AFTER A FIRE, 19

CLEANING UP YOUR HOUSE AFTER A FLOOD AND CLEAN-UP PROCEDURES FOR MOLD IN HOUSES, 41

COMMUNICATIONS & INFORMATION TRANSFER STRATEGY FOR ABORIGINAL GROUPS, 59

COMMUNITY DESIGN: AN ANALYSIS OF DENSITY MEANINGS AND DEVELOPMENT OF A DESIGN TOOL, 86

COMPARING THE PERFORMANCE OF TWO-COAT VS THREE-COAT STUCCO, 33

COMPARISON OF NORTHERN HOUSING COSTS, 43

COMPOSITE MASONRY WALL TIES: FINAL REPORT, 11

COMPREHENSIVE STUDY ON SLAB-ON-GRADE FOUNDATIONS, 9

CONCEPT OF A QUALITY LOCATION AND THE CENTRAL DISTRICTS OF MONTRÉAL, 63

CONDITION SURVEY OF CONDOMINIUMS IN THE GREATER TORONTO AREA (GTA), 26

CONDOMINIUM BUYER'S GUIDE, 32

CONTINUATION OF NORTHERN VENTILATION STUDY, 44

CONTRACT MANAGEMENT COURSE FOR RESIDENTIAL PROPERTY MANAGERS AND BUILDING OWNERS, 48

CONTRIBUTION TO A STUDY ON PACIFIC RIM MARKETS FOR TERMITE-RESISTANT WOOD PRODUCTS, 75

CONVERSION OF HIGH-RISE BUILDINGS TO RESIDENTIAL USE, 26

COOPERATIVE HOUSING PROJECTS IN DIFFICULTY, 64

COST OF CO-OPERATIVE HOUSING, 64

CRISIS SITUATIONS IN COOPERATIVES: INCREASING UNDERSTANDING TO IMPROVE INTERVENTION, 64



## TITLE INDEX

DAWSON CITY DEMONSTRATION PROJECT - MONITORING, 21

DEFINING PERFORMANCE OF WATER RESISTIVE BARRIERS, 41

DEMONSTRATION OF FULL-COST ACCOUNTING TOOLS AND TECHNIQUES, 63

DEMONSTRATION OF HEALTHY HOUSING ON RESERVE, 7

DEMONSTRATION OF SAFE HOUSING ON LIGHTLY CONTAMINATED LANDS, 13

DEPRESSURIZATION RESISTANCE TESTING, 37

DESIGN CHARRETTEs TRANSFORMING YOUR PRACTICE - INTEGRATED DESIGN CHARRETTEs FOR SUSTAINABLE BUILDINGS, 52

DESIGN MULTIPLE-UNIT CHUM'S AND MODULAR HOUSE PACKAGES FOR URBAN AND SUBURBAN, REMOTE AND NORTHERN COMMUNITIES, 35

DETERMINING THE EFFORT NEEDED BY ADULTS AND SENIORS TO CLIMB RAMPS USING MANUAL WHEELCHAIRS, 80

DEVELOP A SET OF ENVIRONMENTALLY SUSTAINABLE SITE AND BUILDING DESIGN, CONSTRUCTION AND OPERATION GUIDELINES FOR SINGLE AND MULTI-FAMILY UNIT HOUSING, MOTELS AND HOTELS FOR THE TOWN OF BANFF, 52

DEVELOPING MATERIAL EMISSIONS STANDARDS FOR ASTM APPROVAL, 37

DEVELOPMENT OF A CEMENT STRESS-SKIN EPS-CORE BUILDING SYSTEM, 27

DEVELOPMENT OF A GUIDE TO THE UNITED KINGDOM BUILDING REGULATIONS, 75

DEVELOPMENT OF A RESEARCH FRAMEWORK FOR POPULATION HEALTH AND HOUSING, 82

DEVELOPMENT OF AN EXPORT TOOL-KIT FOR CHINA, 76

DEVELOPMENT OF AN INSTRUCTOR'S GUIDE AND AN ACCOMPANYING PRESENTATION FOR RESIDENTIAL GUIDE TO EARTHQUAKE RESISTANCE, 33

DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR), 27

DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR) TASK 2: COLLECTION OF ADDITIONAL BUILDING FILES FOR THE HISTAR DATABASE, 27

DEVELOPMENT OF TRANSITION TRAINING FOR OBJECTIVE-BASED CODES, 10

DIRECTED RESEARCH EVALUATION REPORT, 79

DISINVESTMENT AND THE DECLINE OF URBAN NEIGHBORHOODS, 70

DUAL FLUSH TOILET PILOT PROJECT, 53

ECO-ASSESSMENT TOOL FOR PROPERTY MANAGERS OF MULTIPLE UNIT RESIDENTIAL BUILDINGS (MURBS), 48

ECONOMIC FEASIBILITY STUDY OF WATER REUSE AND TREATMENT TECHNOLOGIES, 53

EFFECTS OF URBAN ABORIGINAL RESIDENTIAL MOBILITY AND SERVICE PROVISION, 60

ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS, 16

## TITLE INDEX

- ENERGY EFFICIENCY OPPORTUNITIES MANUAL FOR MULTI-UNIT RESIDENTIAL BUILDINGS, 16
- ENERGY GENERATION AND CONTROL AND THE BUILDING ENVELOPE OF MULTI-UNIT RESIDENTIAL BUILDINGS, 16
- ENERGY USE OF STRAW BALE BUILDINGS WITH COMPARABLE BUILDINGS OF CONVENTIONAL CONSTRUCTION, 17
- ENHANCING THE APPLICABILITY AND USEFULNESS OF CMHC'S HOMEOWNER'S MANUAL FOR NEW HOMES, 66
- ENVIRONMENTAL SCAN OF HOUSING SECTOR GIS PRACTICES, 70
- ESTIMATION OF CORE HOUSING NEED USING THE SURVEY OF HOUSEHOLD SPENDING MICROFILE, 78
- ETHICAL AND SOCIAL FUND INVESTMENTS IN LOWER-TO-MODERATE INCOME AFFORDABLE RENTAL HOUSING IN CANADA: AN ASSESSMENT, 84
- ETHNIC CHANGES AND THE HOUSING MARKET IN RIVIÈRE-DES-PRAIRIES, MONTRÉAL, 78
- ÉTUDE DE L'ORIENTATION SPATIALE DANS LES COMPLEXES RÉSIDENTIELS POUR PERSONNES ÂGÉES PRÉSENTANT OU NON DES TROUBLES COGNITIFS, 86
- EVALUATING HOUSING STABILITY FOR PEOPLE WITH SERIOUS MENTAL ILLNESS AT RISK FOR HOMELESSNESS: FINAL REPORT, 66
- EVALUATION OF AN APARTMENT HEAT RECOVERY VENTILATION SYSTEM, 21
- EVALUATION OF COOPERATIVE HOUSING, 65
- EVALUATION OF OPTIMAL BATH GRAB BAR PLACEMENT FOR SENIORS, 87
- EVALUATION STUDY OF THE SHELTER ENHANCEMENT PROGRAM: SEP, 89
- EVOLVING IMPACT OF E-COMMERCE ON HOUSING FINANCE ACCESS AND AFFORDABILITY: US EXPERIENCE AND LESSONS FOR CANADA, 80
- EXAMINING INUIT SPACE USE IN EURO-CANADIAN HOUSE FORMS, 60
- EXAMINING THE HOUSING CHOICES OF INDIVIDUALS WITH DISABILITIES, 81
- FEASIBILITY OF DEVELOPING A BUILDING CANADA PROGRAM, 34
- FEASIBILITY OF UTILIZING A PORTABLE HOUSING PLANT FOR SINGLE FAMILY DETACHED CONSTRUCTION, 40
- FEASIBILITY STUDY ON THE DEVELOPMENT OF A COMMISSIONING GUIDE FOR NEW HOUSES, 34
- FIELD TESTING OF A POSITIVE PRESSURE VENTILATION DEVICE, 22
- FIELD TESTS OF VENTILATION SYSTEMS INSTALLED TO MEET THE 1993 OBC AND 1995 NBC, 22
- FINANCIAL TOOLS FOR CO2 REDUCTION, 17
- FIRE AND ACOUSTICAL PERFORMANCE OF FLOOR ASSEMBLIES - PHASE II, 27
- FIRST NATIONS HEALTHY HOUSING SUSTAINABLE COMMUNITY DEVELOPMENT SYMPOSIUM, AND UPDATE OF THE 'BEST PRACTICES' PUBLICATION, 8
- FIRST NATIONS HOUSING PROPERTY MANAGEMENT TRAINING COURSES AND RESOURCES, 60

## TITLE INDEX

- FLEXHOUSING FEATURES IN A BENCHMARK HOUSE DESIGN, 36
- GOVERNANCE IN LOCAL PARTNERSHIPS TO ADDRESS HOMELESSNESS, 67
- GUIDE FOR THE HEALTHY RENOVATION OF A ONE STOREY HOUSE CIRCA. 1960-1979, 50
- GUIDE TO THE RULES UNDER THE NORTH AMERICAN FREE TRADE AGREEMENT AND U.S. IMMIGRATION LAW FOR CANADIAN COMPANIES IN THE HOUSING, RENOVATION AND RESIDENTIAL CONSTRUCTION SECTOR, 76
- GUIDELINES FOR MOISTURE MANAGEMENT IN EXTERIOR WALL SYSTEMS, 41
- GUIDELINES FOR ON-SITE MEASUREMENT OF MOISTURE IN WOOD BUILDING MATERIALS, 42
- GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS, 28
- HEALTHY HOUSING IN THE NORTH: TOWARDS A NORTHERN HEALTHY HOUSE DEMONSTRATION PROJECT, 44
- HEALTHY INDOOR ENVIRONMENTS PHASE 2: CONSULTATION PROCESS, 37
- HIRING A HOME INSPECTOR. ABOUT YOUR HOUSE; CE35, 50
- HISTORY OF CANADA'S RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP), 83
- HOUSING CONSTRUCTION INDUSTRY: CHALLENGES AND OPPORTUNITIES FOR THE 21ST CENTURY, 68
- HOUSING DISCRIMINATION IN CANADA: THE STATE OF KNOWLEDGE, 65
- HOUSING FORM AND QUALITY IN RELATION TO CHILDREN'S MENTAL HEALTH, 62
- HOUSING MARKET GUIDES ON FOUR CITIES IN THE UNITED STATES, 76
- HOUSING MARKET RESEARCH: OPPORTUNITIES FOR CANADIAN TRAINING PROGRAMS IN CHINA, 76
- HOUSING NEEDS OF LOW-INCOME PEOPLE LIVING IN RURAL AREAS, 70
- HOUSING OPTIONS FOR RURAL WOMEN LIVING ALONE, 92
- HOW TALOYOAK, NUNAVUT TERRITORY CREATED AFFORDABLE HOUSING FOR YOUTH THROUGH FUNDING PARTNERSHIPS AND THE LESSONS LEARNED = COMMENT TALOYOAK, DANS LE TERRITOIRE DU NUNAVUT, A PRODUIT DES LOGEMENTS ABORDABLES POUR LES JEUNES GRÂCE À DES PARTENARIATS DE FINANCEMENT, ET LES LEÇONS QUE LA COLLECTIVITÉ A TIRÉES DE SON EXPÉRIENCE, 92
- HYGROTHERMAL MODELLING OF THE INTERIOR INSULATION RETROFIT OF A SOLID MASONRY BUILDING, 17
- IDENTIFICATION OF KNOWLEDGE GAPS IN DISASTER INFORMATION FOR HOUSEHOLDERS IN CANADA: FINAL REPORT, 71
- IMPACT OF CONVERSIONS OF RENTAL TO OWNERSHIP UNITS ON HOUSING MARKETS IN ONTARIO, 78
- IMPACT OF HOUSING CHOICES: CONSUMER INFORMATION ON SUSTAINABLE COMMUNITY PLANNING, 89
- IMPLEMENTATION STRATEGIES FOR WATER CONSERVATION, 54
- IMPROVEMENTS TO THE MOISTURE PERFORMANCE OF PRESERVED WOOD FOUNDATIONS, 42



## TITLE INDEX

INDOOR AIR POLLUTION FROM ATTACHED GARAGES, 38

INDUSTRY PROFILE OF CANADIAN LIGHT STEEL BUILDING, 68

IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL ASSEMBLIES - COQUITLAM, BC, 28

IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL SYSTEMS - VANCOUVER, BC, 42

INSULATED CONCRETE FORMS TRAINING PROGRAM, 9

INTEGRATED DESIGN CHARRETTE IN TORONTO FOR ARCHITECTS AND BUILDING PROFESSIONALS, 28

INTERGENERATIONAL HOUSING TRENDS AND CHALLENGES, 71

INTERVENTIONS FOR ROOMING HOUSES, SROS AND TENANTS: FINAL REPORT, 85

INVESTIGATING AND DOCUMENTING FIRST NATION TECH SERVICES INSTITUTES, 61

INVESTIGATION OF SMOKE CONTROL IN HIGH-RISES BY POSITIVE PRESSURE VENTILATION, 19

INVESTOR CONDOMINIUM MARKET IN VANCOUVER, BURNABY, AND RICHMOND, 79

INVOLVING HOMELESS AND FORMERLY HOMELESS CLIENTS IN PROJECTS AND PROGRAMS TO ADDRESS HOMELESSNESS: FINAL REPORT, 67

ISSUES PAPER ON LIABILITY IN HOUSE CONSTRUCTION, 64

LANDSCAPE DESIGN AND MAINTENANCE FOR CANADIAN HOMES, 90

LEAK-PROOFING WINDOWS, PHASE I - FABRICATION, INSTALLATION AND MAINTENANCE, 13

LEAK-PROOFING WINDOWS, PHASE II - A REVIEW OF STANDARDS TESTING AND CERTIFICATION, 14

LET'S CLEAR THE AIR INDOOR AIR QUALITY (IAQ) INITIATIVE, 38

LIFE LEASE HOUSING: CONSUMER DREAM OR CONSUMER NIGHTMARE?, 87

LIFE LEASE OWNERSHIP BY THE ELDERLY OF SUITES WITH CONTINUING CARE SERVICES, 87

LIVING BY WATER GUIDEBOOK, 52

LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING, 29

LOGEMENT INNOVATEUR POUR JEUNES PERSONNES SANS ABRI :RAPPORT FINAL, 93

MAJOR MAINTENANCE AND RESIDENTIAL RENOVATION: A SURVEY OF MEANS TO IMPROVE THE ARCHITECTURAL ACCESSIBILITY OF EXISTING BUILDINGS, 81

MANDATORY HOME INSPECTIONS ON RESALE HOMES IN ONTARIO, 50

MANUFACTURED HOME DESIGN AND LAND LEASE COMMUNITY PLANNING, 40

MANUFACTURED HOUSING CONSULTANTS' TRAINING PROGRAM - PHASE II, 40

MAXIMUM DAY WATER DEMAND REDUCTION MONITORING AND EVALUATION PROJECT, 54

MAXIMUM DAY WATERING DEMAND PHASE II - ASSESSMENT OF WATER CONSERVATION STRATEGIES, 54

MEASURING RESIDENTIAL MOBILITY OF URBAN ABORIGINAL PEOPLE, 61

## TITLE INDEX

- MERGE THE EXISTING NATIONAL AND PROVINCIAL ASSOCIATIONS INTO ONE NEW NATIONAL ENTITY TO REPRESENT THE PRIVATE HOME AND PROPERTY INSPECTION INDUSTRY ACROSS THE COUNTRY, 51
- METROPOLIS CENTRES OF EXCELLENCE FOR RESEARCH ON IMMIGRATION ISSUES, 74
- MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS, 29
- MODIFY AND UPGRADE WALLDRY COMPUTER PROGRAM, 29
- MOLD CLEANUP PROCEDURES: CONTRACTORS' GUIDE, 43
- MONITORING INNOVATIVE MECHANICAL AND ELECTRICAL SYSTEMS, 30
- MONITORING OF THE NORTH ON-SITE WASTE WATER RECYCLING MICROSYSTEMS, 45
- MONTRÉAL: A GREAT TRADITION OF MEDIUM-DENSITY HOUSING, 36
- NATIONAL CONSULTATION TO EVALUATE: AN ASSET-BASED APPROACH TO ANTIPOVERTY USING HOUSING AS A CATALYST, 71
- NATIVE INSPECTION SERVICES INITIATIVE (NISI) GUIDE, 8
- NOISE ISOLATION PROVIDED BY GYPSUM BOARD PARTITIONS, 9
- NON-PAYMENT OF RENTS AND THE HEALTH OF THE RENTAL SECTOR IN QUEBEC, 85
- NORTH WEB-SITE, 45
- NORTHERN HEALTHY HOUSE DEMONSTRATION, 45
- NORTHERN HEALTHY MIXED-USE BUILDING DEMONSTRATION, 46
- NORTHERN HEATING AND VENTILATION SYSTEMS, 22
- NORTHERN LANDSCAPING: A GUIDE TO RESTORING THE PLANTS AND SOIL IN NORTHERN COMMUNITIES, 46
- ONLINE RESIDENTIAL RENTAL GUIDE, 85
- OPPORTUNITIES FOR IMPROVING THE INSPECTIONS PROCESS, CITY OF VANCOUVER, BRITISH COLUMBIA = OCCASIONS D'AMÉLIORER LE PROCESSUS D'INSPECTION, VILLE DE VANCOUVER (COLOMBIE-BRITANNIQUE), 82
- OPTIMIZING HEAT AND AIR DISTRIBUTION SYSTEMS WHEN RETROFITTING HOUSES FOR ENERGY EFFICIENCY, 18
- PERFORMANCE ASSESSMENT OF LOW FLOW TOILETS, 55
- PERFORMANCE ASSESSMENT OF THE LEBRETON FLATS DISTRICT HEATING SYSTEM, 23
- PERFORMANCE GUIDELINE DEVELOPMENT FOR BASEMENT SYSTEMS AND MATERIALS, 10
- PERFORMANCE OF AN INNOVATIVE HIGH-RISE RESIDENTIAL BUILDING, 30
- PHASE III - DEVELOPMENT OF A SUSTAINABLE COMMUNITY DESIGN CHARRETTE FOR SOUTH EAST FALSE CREEK, VANCOUVER, 90
- POTENTIAL ELEMENTS OF A HUMAN RESOURCES DEVELOPMENT STRATEGY FOR THE RESIDENTIAL CONSTRUCTION INDUSTRY, 69

## TITLE INDEX

- POUSSIÈRE DOMESTIQUE : UN OUTIL EFFICACE ET ABORDABLE D'ÉVALUATION DE SALUBRITÉ  
MICROBIENNE RÉSIDENTIELLE : RAPPORT FINAL, 38
- PRACTICAL MEASURES FOR THE PREVENTION OF BASEMENT FLOODING DUE TO MUNICIPAL SEWER  
SURCHARGE, 10
- PRINCE EDWARD ISLAND BIRTH COHORT STUDY OF MOLD IN HOMES, 39
- PRODUCTIVITY TRENDS IN THE CONSTRUCTION SECTOR IN CANADA: A CASE OF LAGGING  
TECHNICAL PROGRESS, 69
- PUBLIC HOUSING TENANT SELF-MANAGEMENT: AN EVALUATION OF THE ALEXANDRA PARK CO-OP  
CONVERSION PROCESS IN TORONTO, 65
- QUANTIFYING UNIVERSAL DESIGN: A PROGRAM FOR IMPLEMENTATION, 36
- RECYCLE: LIFECYCLE - HOW TO RENOVATE A HOME FOR CHANGE, 51
- REDUCTION OF AIR INTAKE CONTAMINATION OF HIGH-RISE RESIDENTIAL BUILDINGS, 23
- REFINING OF CMHC HOUSING AFFORDABILITY INDICATORS, 73
- REMOTE MONITORING AND CONTROL OF ON-SITE WASTEWATER TREATMENT, RECYCLING AND  
RE-USE SYSTEMS, 55
- RENOVATING THE HOME FOR ASTHMA: AN INTERVENTION STUDY, 39
- RENTAL, ROOMING HOUSE AND NON-RESIDENTIAL CONVERSION COMPONENTS OF THE RESIDENTIAL  
REHABILITATION ASSISTANCE PROGRAM (RRAP PHASE I), 83
- REPAIR AND RETROFIT CASE STUDIES OF THE LOFTS CORTICELLI COMPLEX, 31
- REPAIR NEEDS ASSESSMENT OF RENTAL HOUSING IN THE CITY OF MISSISSAUGA, 86
- REQUALIFICATION OF SUBURBS AND REGULATORY FRAMEWORKS: CURRENT SITUATION AND EASING  
MEASURES, 63
- RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY, 39
- RESEARCH ON SOLUTIONS TO PYRITE-RELATED BACKFILL EXPANSION PROBLEMS, 35
- RESIDENTIAL DEVELOPMENT IN COASTAL COMMUNITIES: ADDRESSING CLIMATE CHANGE THROUGH  
SUSTAINABLE COASTAL PLANNING, 86
- RESIDENTIAL INTEGRATION OF YOUNG MIGRANTS IN QUEBEC, 94
- RETROFITTING A CITY: A GUIDE FOR MUNICIPALITIES TO IMPLEMENT A BUILDING RETROFIT PROGRAM,  
18
- REVISION OF HOME CARE: A GUIDE TO REPAIR AND MAINTENANCE, 51
- REVISIONS TO BRICK VENEER STEEL STUD BEST PRACTICE GUIDE, 31
- REVISIONS TO THE OPERATING GUIDES FOR OWNERS, MANAGERS AND CUSTODIAL STAFF, 48
- REWRITING TEST STANDARD CAN/CGSB-149.10 - DETERMINATION OF THE AIRTIGHTNESS OF BUILDING  
ENVELOPES BY THE FAN DEPRESSURIZATION METHOD, 11
- SAFE EFFLUENT WASTEWATER RECOVERY SYSTEM (SEWRS) ERP 2000, 55



## TITLE INDEX

- SEISMIC PERFORMANCE OF RAINSCREEN STUCCO, 31
- SEMINARS ON SENIORS' HOUSING TO THE RESIDENTIAL CONSTRUCTION AND HEALTH CARE SECTORS, 88
- SPACE EFFICIENT UNIVERSAL DESIGN INNOVATIONS, 81
- SPECIAL STUDIES ON 1996 CENSUS DATA, 72
- STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS, 12
- STUDY OF TENANT EXITS FROM HOUSING FOR CHRONICALLY HOMELESS PEOPLE, 68
- STUDY OF THE MIDWEST BUILDING PRODUCTS MARKET IN THE REGIONS OF ILLINOIS, WISCONSIN AND MISSOURI, 77
- STUDY ON THE RESIDENTIAL INTEGRATION OF IMMIGRANT YOUTH IN MONTRÉAL, 74
- STUDY ON THE RESIDENTIAL PATH OF PEOPLE AGED 45 TO 64 YEARS IN THE MONTRÉAL AND QUÉBEC CENSUS METROPOLITAN AREAS (CMAS), 79
- SUPPLY OF LABOUR IN THE RESIDENTIAL CONSTRUCTION INDUSTRY, 69
- SURVEY AND LITERATURE REVIEW OF SOCIOECONOMIC TRENDS AFFECTING CONSUMERS AND HOUSING MARKETS, 79
- SURVEY OF MULTI-UNIT RESIDENTIAL BUILDING CHARACTERISTICS AND ENERGY USE DATA, 19
- SUSTAINABLE COMMUNITY PLANNING AND DEVELOPMENT: DESIGN CHARRETTE PLANNING GUIDE: FINAL REPORT, 90
- SUSTAINABLE COMMUNITY SITE PLAN, INFRASTRUCTURE PLAN AND HEALTHY HOUSE DESIGNS, 8
- SUSTAINABLE INTEGRATION OF INFRASTRUCTURE AND BUILDINGS IN MAASTRICHT, THE NETHERLANDS, 91
- TAXATION OF RESIDENTIAL PROPERTY IN CANADA, 74
- TECHNICAL AUDIT COURSE FOR PROPERTY MANAGERS, 49
- TECHNICAL TRANSFER ARTICLE - HIGH RISE FIRE SAFETY CONSIDERATIONS, 20
- TECHNOLOGY ROAD MAP FOR INTELLIGENT BUILDING TECHNOLOGIES, 32
- TESTING CONSUMER RECEPTIVITY TO SUSTAINABLE COMMUNITY DESIGN FOR A DEMONSTRATION-BUILD SITE IN OKOTOKS, ALBERTA, 91
- THEORY TO PRACTICE: LESSONS LEARNED FROM THE USE OF PERFORMANCE ASSESSMENT MEASURES TO IMPLEMENT SUSTAINABLE COMMUNITIES: FINAL REPORT, 92
- TIPS ON THE SELLING IN THE U.S. GREEN HOUSING MARKET, 77
- TOGETHER INDEPENDENTLY: A HOUSING CONCEPT TO AID THE COMMUNITY INTEGRATION OF SENIORS AND DISABLED ADULTS = ENSEMBLE MAIS AUTONOMES : UN CONCEPT DE LOGEMENT QUI FAVORISE L'INTÉGRATION DES ÂÎNÉS ET DES ADULTES HANDICAPÉS DANS LA COLLECTIVITÉ, 88
- TRANSFORMING YOUR PRACTICE: INTEGRATED DESIGN CHARRETTES FOR SUSTAINABLE BUILDINGS: TORONTO CHARRETTE RESULTS, 52

## TITLE INDEX

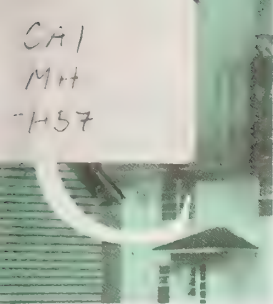
- UNDERSTANDING THE MOTIVATIONS OF HOMEOWNERS TO CONVERT THEIR BUNGALOWS IN QUÉBEC CITY SUBURBS, 84
- UPDATE OF THE STUDY ON MID-ATLANTIC BUILDING MATERIALS MARKET, 77
- UPDATE THE NORTHERN UTILITY COSTS REPORT, 47
- URBAN ABORIGINAL PERCEPTIONS OF ACCESS TO HOUSING, 62
- URBAN ABORIGINAL RESIDENTIAL MOBILITY, 62
- USE OF COMPRESSED-AIR-FOAM TECHNOLOGY FOR FIRE PROTECTION OF HOUSING IN THE NORTH, 47
- USE OF ON-SITE WASTE WATER RECYCLING MICROSYSTEMS FOR SPRINKLER SUPPLY, 47
- USER INTERFACE FOR CD-ROM ON MARKET GUIDES TO THE U.S., 77
- WATER AND SEWAGE HANDLING SYSTEMS IN NORTHERN AND REMOTE COMMUNITIES, 55
- WATER EFFICIENCY CASE STUDIES, 56
- WATER QUALITY MONITORING OF THE TORONTO HEALTHY HOUSE, 56
- WHY CITIES MATTER: CANADIAN CITY-REGIONS IN A GLOBAL AGE, 63
- WOOD USAGE IN STRAW BALE HOUSE CONSTRUCTION, 35
- YUKON FLEX/HEALTHY HOUSING DEMONSTRATION, 48







Visit our Web site at: [www.cmhc-schl.gc.ca](http://www.cmhc-schl.gc.ca)

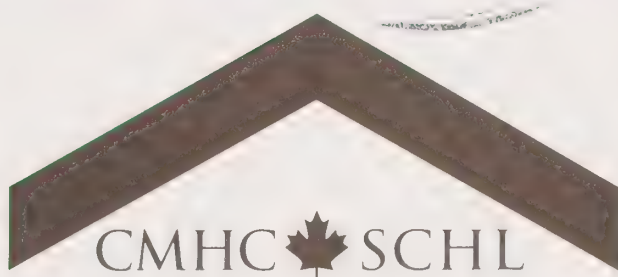


# CURRENT HOUSING RESEARCH

VOLUME 9, NUMBER 2

WINTER 2002

**SOCIAL,  
ECONOMIC AND  
TECHNICAL  
RESEARCH**



HOME TO CANADIANS  
Canada





# CURRENT HOUSING RESEARCH

Volume 9  
Number 2  
Winter 2002



Issued also in French under the title: ***Recherches courantes sur l'habitation***

Publié aussi en français sous le titre: ***Recherches courantes sur l'habitation***



## CURRENT HOUSING RESEARCH ORDER FORM

If you wish to receive any of the completed reports or bibliographies listed, or if you would like to be on the mailing list to receive *Current Housing Research*, please fill out this form and send it to:

Canadian Housing Information Centre  
Canada Mortgage and Housing Corporation  
700 Montreal Road  
Ottawa ON K1A 0P7  
Fax (613) 748-4069  
Telephone 1-800-668-2642  
Email: [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)

### COMPLETED REPORTS REQUESTED


### BIBLIOGRAPHIES REQUESTED


☐ Send copies of above reports/bibliographies

☐ Add my name to your mailing list to receive *Current Housing Research*

Name

Mailing Address

City

Province

Postal Code



## INTRODUCTION

Welcome to "*Current Housing Research*". This publication merges "*Housing Research Quarterly*" and "*Current Housing Technology Initiatives*" and continues the numbering of the "*Housing Research Quarterly*".

Under Part IX of the National Housing Act the Government of Canada provides funds to Canada Mortgage and Housing Corporation to conduct research into the social, economic and technical aspects of housing and related fields.

*Current Housing Research* is compiled and produced three times a year by the Canadian Housing Information Centre. This publication provides information and access to research which is undertaken and sponsored by the Corporation. It is also available on CMHC's Website at [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca)

The publication contains information on completed research reports, new publications, videos and bibliographies, as well as planned and ongoing research projects. An alphabetical title index of items listed is included at the end for quick reference.

The overall arrangement of "*Current Housing Research*" is by broad subject category. Within each subject category, lists of planned and ongoing projects and completed research reports are described.

Each entry can contain the following elements:

- The project or report title;
- A description of the project or report results;
- The CMHC Project Officer who is managing the project;
- The Division within CMHC which is responsible for the project;
- For External Research Projects, the grant recipient undertaking the research;
- A Contract Identification Number (CIDN);
  
- The Status of the project: whether the project is in a planned, ongoing or completed phase.  
"Planned Projects" are those that are not yet underway, but are likely to be initiated in the current year. "Ongoing Projects" refer to research projects which are currently underway. No reports are yet available. Once the project is completed, and a report is available for distribution, it will be listed as a "completed report."
  
- Whether the report resulting from the research project is available and the address where the completed report can be obtained.

To discuss research projects that are recent or ongoing, please call CMHC General Inquiries at (613) 748-2000 and ask for the CMHC Project Officer identified under each project description.





## CMHC'S EXTERNAL RESEARCH PROGRAM

The objective of the CMHC External Research Program (ERP) is to encourage and enable researchers in the private and not-for-profit sectors to put forward and carry out relevant, innovative, and high quality housing research projects. Under the Program, financial contributions are made to support research investigations into important questions, problems, and issues affecting Canadian housing. Housing research priority areas are identified in the "External Research Program Grants for Housing Research Guidelines and Application Form".

Applicants to the External Research Program must be Canadian citizens or have permanent resident status in Canada.

Independent researchers as well as those employed in Canadian universities, institutions, private consulting firms, the professions and the housing industry may apply for these grants.

Full-time students at the graduate or undergraduate level are not eligible to apply. Students may be hired to assist in the conduct of the research, but under no circumstances may they take over responsibility for the direction of the work or the quality of the final report.

Individuals who are full-time federal, provincial or municipal government employees may apply. However, to be eligible, an applicant must provide a letter of support from her/his employer which shows that the proposed research is not part of, and will not interfere with, her/his regular work. CMHC employees are not eligible to receive grants under this Program.

CMHC is interested in receiving applications on topics related to its housing research priority areas. New ideas and innovative approaches in these areas are welcome.

To obtain the booklet outlining the priority research areas, the guidelines and application form for the External Research Program you may contact:

The Administrator  
CMHC External Research Program  
Research Division  
Canada Mortgage and Housing Corporation  
700 Montreal Road, Room C7-307  
Ottawa, Ontario  
K1A 0P7





## TABLE OF CONTENTS

	PAGE
Order Form	1
Introduction	2
CMHC's External Research Program	3
Subject Index	5
Technical Research	6 - 59
Social and Economic Research	60 - 101
Bibliographies	103 - 107
Title Index	108 - 118



## SUBJECT INDEX

Aboriginal Housing .....	7, 61	Housing Design.....	39
Acoustics .....	9	Housing Export Opportunities .....	79
Basements, Foundations & Crawl Spaces.....	10	Housing Forecasting & Demand .....	83
Building Codes .....	11	Housing Market .....	83
Building Materials .....	11	Housing Research .....	84
Children's Environment.....	64	Indoor Environment .....	41
City Planning & Human Settlements .....	65	Manufactured Housing.....	44
Concrete .....	13	Moisture & Mold .....	45
Consumer Protection.....	66	Mortgages & Housing Finance .....	85
Contaminated Lands .....	14	Northern Housing .....	48
Cooperative & Non-profit Housing .....	66	Persons with Disabilities .....	85
Discrimination in Housing.....	68	Population Health .....	86
Doors & Windows .....	14	Property Management.....	52
Energy Conservation .....	15	Regulatory Reform.....	87
Fires & Fire Prevention.....	20	Renovation & Inspection .....	54, 88
Heating & Ventilation .....	21	Rental Housing .....	89
High-Rise & Multiple Unit Construction ..	27	Residential Development .....	92
Home Ownership.....	35, 69	Seniors .....	93
Homelessness.....	69	Social Housing .....	96
House Construction.....	35	Sustainable Development & Healthy Housing .....	56, 96
House Construction Industry.....	72	Water Conservation, Reuse & Management.....	56
Housing .....	73	Women and Housing .....	100
Housing Affordability.....	76	Youth and Housing .....	100
Housing & Immigration .....	77		
Housing & Taxation .....	78		





## TECHNICAL RESEARCH





## ABORIGINAL HOUSING

### ABORIGINAL HOUSING: LOCAL DESIGN AND MATERIAL

This project responds to opinion that house designs found in Aboriginal communities are inappropriate and that perfectly good building materials exist on reserve but are never used. The project assumes that in fact there are a significant number of examples where appropriate designs have been put in place and where the potential use of local material has been investigated. The project will identify these examples, and document a selected number of them as case studies. The case studies will produce material suitable for dissemination.

The general approach is:

- to build an inventory of past initiatives on increasing the Aboriginal relevance of housing design and on assessing the feasibility of using local materials;
- to select a range of examples from the inventory for case study analysis; and
- to draw conclusions along the lines of "lessons learned."

**CMHC Project Officer :** *Phil Deacon*

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### DEMONSTRATION OF HEALTHY HOUSING ON RESERVE

This project is being undertaken in partnership with First Nations communities. The objectives are to support the design, construction and demonstration of five on-reserve Healthy Houses near Montreal, Belleville, Thunder Bay, Winnipeg, and on band land in N'Dilo and Dettah near Yellowknife. To date, four houses have been built and demonstrated in the following communities - Kanawake QC, Eagle Lake ON, Roseau River MB, plus several micro-sewage treatment systems in NT. Native communities own and occupy these demonstration houses, which were constructed by locally trained trades and specialists. A goal of the project was to better equip First Nations community and other decision makers, and the public to understand the importance of constructing more affordable, appropriate and environmentally sustainable housing. A CMHC report will be produced detailing house costs and benefits, designs and systems at the completion of the project. An About Your House summary has already been published which describes the Eagle Lake Healthy House and its matching "EcoNomad" utilities container. A 30 minute video has also been prepared which describes the Kanawake Healthy House and their plans to build a "sustainable subdivision" of 27-35 homes on a ten acre "ecovillage" site. The Tyendinaga Mohawks (near Belleville ON) have already built four Granny Houses and five Seniors homes which meet Healthy Housing IAQ goals (Indoor Air Quality). This community is now preparing to design and build a "sustainable subdivision" of some 36 homes. The N'Dilo and Dettah communities have installed micro-sewage systems in a number of homes, following the demonstration and testing of a prototype micro-system in a single family house. The performance of these micro-systems is now being monitored in collaboration with the NWT Housing Corporation and an evaluation report has been prepared by UMA Engineers under contract to the City of Yellowknife.

**CMHC Project Officer :** *Chris Ives*

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ABORIGINAL HOUSING

### FIRST NATIONS HEALTHY HOUSING SUSTAINABLE COMMUNITY DEVELOPMENT SYMPOSIUM, AND UPDATE OF THE 'BEST PRACTICES' PUBLICATION

This project's objective is to organize and facilitate a two day First Nations Healthy Housing and Sustainable Community Development Symposium and to update the 'Best Practices' publication.

**CMHC Project Officer :** Alain Croteau

**CIDN :** 2497 1500002

**Division :** Assisted Housing Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### NATIVE INSPECTION SERVICES INITIATIVE (NISI) GUIDE

Over the years, First Nations throughout Canada have become increasingly interested in being involved in inspecting renovations and new homes in their territories. To address this desire, CMHC developed the Native Inspection Services Initiative (NISI) in 1995, to provide greater First Nation involvement in inspections for CMHC programs and to help build First Nation inspection capacity. Building inspection capacity is an important step in improving First Nations' housing quality.

This Guide explains the requirements of NISI and is a reference guide to inspection for NISI inspectors and organizations. CMHC will continually update the Guide and plans to put the Guide and updates to it on the CMHC web site.

*Developed by the Southern First Nations Secretariat, Ontario. CMHC Project Officer: Alain Croteau. Ottawa: Canada Mortgage and Housing Corporation, 2001. 90 pages*

**NOTE :** Aussi disponible en français sous le titre : Guide sur l'initiative des services d'inspection autochtones (ISIA)

**STATUS :** Completed Report

**AVAILABILITY :** On a loan basis from the Canadian Housing Information Centre

### SEABIRD FIRST NATIONS FLEX/HEALTHY HOUSING DEMONSTRATION

The Seabirds Island demonstration project will provide a full scale prototype of Flexhouse/Healthy house models and will apply principles of sustainability and integrated design to the design and decision process. The project will be open for public demonstration for two years and will provide a model for application in remote First Nation communities. The contractor will conduct architectural design consulting to design, build and commission seven houses that are affordable, easy to build, easy to change, easy to maintain and inexpensive to operate.

**CMHC Project Officer :** Allan Dobie

**CIDN :** 2663 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## ABORIGINAL HOUSING

### SUSTAINABLE COMMUNITY SITE PLAN, INFRASTRUCTURE PLAN AND HEALTHY HOUSE DESIGNS

The objective of this project is to develop a sustainable community site plan, infrastructure plan and healthy house designs for approximately thirty homes in cooperation with the community of Tyendinaga. The intention of this project is to demonstrate that when alternative infrastructure options, land use patterns and high performance homes are explored simultaneously as an integrated design solution that improvements can be made in all these categories without an overall price increase. The integrated participatory design process will include community workshops involving both the immediate community as well as the broader Ontario First Nations community and design professionals. The results of the workshops and the resulting community and house designs will be published in a report and the first healthy high performance home will be available for public viewing for a period of one year.

**CMHC Project Officer :** Douglas B Pollard

**CIDN :** 2408 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ACOUSTICS

### NOISE ISOLATION PROVIDED BY GYPSUM BOARD PARTITIONS

The objective of this project was to analyze the results of 350 sound transmission tests conducted on gypsum board partitions of various compositions. The results of these tests were published in report no. 761 produced by the Institute for Research in Construction of the National Research Council of Canada. This report conveys the conclusions of the analysis; it highlights the main factors influencing the performance of gypsum board partitions: the gypsum boards themselves, the studs and stud arrangements, the resilient furrings, and the sound absorptive materials inserted in the cavity.

*Prepared by MJM Acoustical Consultants Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Jacques Rousseau. Ottawa: CMHC, 2002. 169 pages*

**NOTE 1 :** Aussi disponible en français sous le titre : Isolation phonique procurée par les plaques de plâtres

**NOTE 2:** No. 02-108 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre



## ACOUSTICS

### QUALIFICATION OF THE DEGREE OF ACOUSTIC COMFORT PROCURED BY MULTI-FAMILY BUILDINGS - PHASE II

This project's objective is to improve the quality of buildings and, consequently, the quality of life of the people who live in them. The development of realistic acoustic insulation objectives based on previously acquired knowledge and a rigorous method to evaluate and control the acoustic quality of multi-family buildings is the best way to ensure that the knowledge of acoustic insulation in multi-family buildings will be used to make better buildings in the future.

**CMHC Project Officer :** Jacques F Rousseau

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2525 0201016

**STATUS :** Ongoing

**\*NEW\***

## BASEMENTS, FOUNDATIONS & CRAWLSPACES

### COMPREHENSIVE STUDY ON SLAB-ON-GRADE FOUNDATIONS

The purpose of this project is to investigate and provide answers to technical questions on slab-on-grade foundations. This includes slab insulation, slab moisture protection, the selection of appropriate heating systems, and slab-on-grade cost effectiveness in various climate regions of Canada. Other aspects to be studied will be consumer acceptance of this type of "basementless" house, alternate layout designs to accommodate storage, and overall pros and cons of the alternative house foundation type. A consultant is expected to start this project this fall.

**CMHC Project Officer :** Ken Ruest

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2275 0200

**STATUS :** Planned

### INSULATED CONCRETE FORMS TRAINING PROGRAM

This was a multi-partnered project led and managed by the Cement Association of Canada (CAC). Participants include the Portland Cement Association (PCA), Insulating Concrete Form Association (ICFA), National Energy Conservation Association (NECA), Alliance of Canadian Building Officials Association (ACBOA), Association of Canadian Community Colleges (ACCC), Seneca College, Southern Alberta Institute of Technology (SAIT), Atlantic Home Builders' Training Board (AHBTB), Canadian Carpentry Union, CHBA, NRCan and CMHC. The purpose of this project was to develop and pilot a course curriculum and course training materials on how to properly construct insulated form foundation and building systems (ICFs). The course consists of two modules; Introduction to Insulated Concrete Form Construction, and Fundamentals of Concrete Footings and Foundations. It will be promoted to ICF installers, home builders, home inspectors, building officials, and the trades involved in the installation of ICFs. The course material was developed and piloted in two phases over a two year period from 2000 to 2002. The implementation of the training program into various educational institutions across the country will occur in 2002-2003. Discussions with educational institutions are currently underway. For more information on this training program, contact the Cement Association of Canada

**STATUS :** Completed

**AVAILABILITY :** Cement Association of Canada

## BASEMENTS, FOUNDATIONS & CRAWLSPACES

### PRACTICAL MEASURES FOR THE PREVENTION OF BASEMENT FLOODING DUE TO MUNICIPAL SEWER SURCHARGE

This External Research Program (ERP) project is reviewing practical measures currently available to homeowners experiencing basement flooding due to sewer surcharges. The research included a survey of municipalities to discover how commonly this type of flooding occurs. The consultants will also analyze existing devices or measures to prevent sewer surcharge, and will draft advice for householders and builders on the more successful solutions identified.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2437 0200010

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## BUILDING CODES

### DEVELOPMENT OF TRANSITION TRAINING FOR OBJECTIVE-BASED CODES

Under the auspices of the Canadian Commission on Building and Fire Codes (CCBFC), CMHC is contributing to a partnership of National Building Code stakeholders to develop transitional training material for the objective-based codes which will include pilot testing. Content will provide for training on the structure and new information to be included in the 2004 objective-based code, on the evaluation of alternative solutions to be allowed under objective-based codes (e.g., using sprinklers in lieu of fire separations), on assessment criteria to allow for transferability of alternatives and their impact on other code requirements, on preparation of knowledge tests, on development of an instructor's guide, and on pilot testing. As provincial, territorial and municipal code enforcement officials have the most comprehensive information requirements, material will be developed at their level and then adapted for other stakeholder groups to meet their needs. This project will develop according to the following schedule: Year 2002 - Training needs assessment, Year 2003 - Development of training material, Year 2004 - Pilot-test and finalize training material. The training needs assessment phase will commence this Fall and be completed early in 2003.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2700 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Seminar/training is not yet available

## BUILDING MATERIALS

### CEMENT SKIN EPS CORE BUILDING SYSTEM: PROOF OF CONCEPT TESTING - PRELIMINARY STRUCTURAL EVALUATION

This research was carried out on a cementitious-skin structural sandwich wall having a core of expanded polystyrene (EPS). As a simple site-built assembly, the method was initially intended for low cost owner-build applications. It can be used to construct high performance building envelopes that can be built quickly, with low-skilled labour, at low cost and with materials that are readily available. The proponents, Brad Robinson and Emmanuel Blain-Cosgrove, developed the system with the challenges of sustainable building in mind: affordability, energy efficiency, minimal environmental impact materials, and occupant health. It is composed of an expanded polystyrene (EPS) panel core, wrapped in polymer mesh and covered with stucco on both sides. The result is a highly resource and energy efficient building envelope system.

## BUILDING MATERIALS

The project's objective was to undertake a 'proof of concept testing' of the wall system to verify its structural capacity and to determine if it is suitable and safe for use in ancillary and residential buildings. Research was conducted by Prof. Yixin Shao from the Civil Engineering Dept. at McGill University. Among the proof of concept tests were compressive, shear and flexural performances of samples and a full-scale wall. Freeze-thaw (durability) and blow-torch tests were also carried out. From the results, it could be concluded that the EPS sandwich is strong enough to serve as a load bearing exterior wall for one-storey residential housing, even by minimizing materials. Further work on the system could look at methods to improve fire safety and the effect of water saturation, as proposed by R.E. Platts in his appended independent review of the research.

*Presented by Emmanuel Blain-Cosgrove. CMHC Project Officer: Silvio Plescia. Ottawa: Canada Mortgage and Housing Corporation, 2001. (External Research Program Research Report) 52 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### COMPOSITE MASONRY WALL TIES: FINAL REPORT

This project aimed at developing a prototype masonry tie using composite materials, which would fulfill structural requirements, be immune to corrosion and manufactured at a lesser cost. The project originated from the fact that current galvanized masonry ties do not meet new standards. The alternative, stainless steel ties are 80% to 100% more expensive.

Several prototypes were developed and tested, concluding that an adjustable tie can be manufactured from glass fibre reinforced polymer composite (GFRPC). Specifically, the most promising tie would be used between masonry veneer and a concrete block backup wall system with 50 mm air space and 50 mm rigid insulation. The investigator made prototypes that meet current standards and show promise that they could be manufactured competitively.

*Prepared by Vera Straka, Dept. of Architectural Science, Ryerson University. CMHC Project Officer: Luis de Miguel. Ottawa: Canada Mortgage and Housing Corporation, 2002. (External Research Program Research Report) 51 pages*

**NOTE:** No. 02-109 in the Research Highlights Technical Series summarizes the results of the research and is available on the CMHC web site

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

### MATERIAL PROPERTIES OF STRAW LIGHT CLAY INFILL SYSTEMS

This ERP project will establish the material composition and properties of an alternative building product, Straw Light Clay (SLC) infill systems. Laboratory testing will demonstrate its suitability for use in Canadian climates.

**CMHC Project Officer :** Don Fugler

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2525 0201011

**STATUS :** Ongoing

**\*NEW\***



## BUILDING MATERIALS

### SEISMIC PERFORMANCE OF RAINSCREEN STUCCO

As an integral phase of a larger 'Earthquake 99 Project' (a project to develop practical cost-effective methods to substantially reduce heavy earthquake damage to residential wood frame construction) Canada Mortgage and Housing Corporation in partnership with the Homeowner Protection Office and British Columbia Housing Management Commission contracted with the University of British Columbia and TBG Seismic Consultants to research the seismic performance of rainscreen stucco exterior cladding systems for residential wood frame construction in BC. The primary objective of this research is a comparative earthquake performance evaluation of rainscreen and non-rainscreen stucco systems. The secondary research objective is the development of refinements to the design of rainscreen stucco systems to improve performance when subjected to seismic loading. This comprehensive study includes an extensive test series to determine the strength of different stucco types, static cyclic tests of single wall specimens, the analytical modeling of wall systems with stucco, and the dynamic testing of a full-scale house incorporating a stucco wall system. The completion of this project is expected by end of fall 2002.

**CMHC Project Officer :** *Silvio Plescia*

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2480 0200001

**STATUS :** Ongoing

**\*NEW\***

### TESTING OF AIR BARRIER MEMBRANES IN WALL ASSEMBLIES

Design and conduct a testing program to ascertain the performance and risk of air barrier materials and assemblies using recent construction materials in actual assemblies. Specifically, the purpose of the research project is to determine the effect that exposure to sustained environmental conditions, wetting of the substrate, and material compatability has upon the adhesion strength between air barrier materials and substrates.

**CMHC Project Officer :** *Luis de Miguel*

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2535 0200002

**STATUS :** Ongoing

**\*NEW\***

## CONCRETE

### BEST PRACTICE GUIDE FOR PRE-CAST CONCRETE WALLS

The objective of this project is to develop a practical, advisory document for designers, architects and engineers, and manufacturers, related to precast wall panels in residential applications. Precast is a well developed system in commercial applications but it requires special treatment when used in housing. The project will be conducted in partnership with the Canadian Precast and Prestressed Concrete Institute, installers and their associations. This Guide will be produced as a joint publication through a collaborative project with Public Works Government Services Canada. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to precast walls, construction details in AutoCAD format, outline specifications and additional sources of information and references.

**CMHC Project Officer :** *Luis de Miguel*

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2215 0200001

**STATUS :** Ongoing

## CONCRETE

### STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS

This study was initiated to address concerns raised at a round-table discussion convened by Canada Mortgage and Housing Corporation to discuss concrete deterioration and repair issues for buildings. It was generally agreed that there is no consistent approach to concrete investigations and repairs and that the development of an assessment and repair protocol would be beneficial. In achieving a concrete repair protocol, the first step is to identify the state-of-the-art and the current practice for investigation, repair and monitoring strategies. State-of-the-Art is considered to be the highest level of technology in the field at this time and Current Practice is considered to be the procedures that are in general or prevalent use by most consultants. This project will research current assessment, monitoring and repair strategies for concrete repair employed by engineering consulting firms commonly involved in concrete investigation and restoration projects. Existing protocols commonly used in the field as well as existing protocol guidelines assembled by various agencies (e.g. CSA) will be catalogued. This project is expected to be completed by end of fall 2002.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 1890 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CONTAMINATED LANDS

### INVESTIGATION OF ACCELERATED DOMESTIC OIL TANK CORROSION

The vast majority of homes in Atlantic Canada use oil-burning equipment for home heating and generate hot water for domestic and heating purposes. Oil is stored in tanks, either outside or inside the house and each year, millions of dollars are spent in cleaning up spills from leaks associated with these oil storage tanks. Some tanks have been known to last 30 years in service without leaks; others failing within a few years of service. The research project will investigate the extent and causes of the corrosive elements and suggest ways to prevent corrosion of the tanks. The project will examine the extent of interior corrosion of domestic oil tanks that have been in operation for various periods of time. In particular the study will build upon research carried out under a previous CMHC grant, wherein it was found that water/chloride contamination appeared to be the cause of tank corrosion. The project is expected to be completed in the spring of 2003.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2525 0201010

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## DOORS AND WINDOWS

### LEAK-PROOFING WINDOWS, PHASE I - FABRICATION, INSTALLATION AND MAINTENANCE

Recent CMHC surveys including "The Survey of Building Envelope Failures in the Coastal Climate of British Columbia" and "Wall Moisture Problems in Alberta Dwellings" revealed that exterior moisture penetration through and/or around windows (at window wall interfaces) is a significant contributor to the envelope moisture problem. The objective of this project is to undertake a study which identifies the nature and causes of moisture ingress problems associated with windows



## DOORS AND WINDOWS

and window to wall interfaces. The study will answer four key questions: 1. What are the important leakage paths associated with windows? 2. What are the primary causes of these leakage paths? 3. What are the key improvements that need to be made to address these leakage paths and causal factors? and 4. What industry sector can best address these improvements? This project, funded by Canada Mortgage and Housing Corporation in partnership with the Homeowner Protection Office and British Columbia Housing Management Commission, is expected to be completed by mid-fall 2002.

**CMHC Project Officer :** *Silvio Plescia*

**CIDN :** 2285 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## LEAK-PROOFING WINDOWS, PHASE II - A REVIEW OF STANDARDS TESTING AND CERTIFICATION

Recent CMHC surveys including "The Survey of Building Envelope Failures in the Coastal Climate of British Columbia" and "Wall Moisture Problems in Alberta Dwellings" revealed that exterior moisture penetration through and/or around windows (at window wall interfaces) is a significant contributor to the envelope moisture problem. The objective of this research project, funded by Canada Mortgage and Housing Corporation in partnership with the Homeowner Protection Office and the British Columbia Housing Management Commission, will be to conduct a detailed review of the Canadian Window Standard CSA A440, together with all its attachments, to review the test requirements related to moisture penetration as outlined in the standards, and to review, assess and evaluate the window certification programs and processes. This research project will identify recommended solutions and opportunities for alleviating these moisture problems into the wall assembly from the window/wall interface. This study will complement a companion study "Leakproofing Windows, Phase I - Fabrication, Installation and Maintenance" in which the primary window leakage paths and causal factors are identified from insitu window-wall performance records.

The CSA A440 Window Standards Committee is considering the adoption of and harmonizing with the North American Fenestration Standards (NAFS). This project will also attempt to consolidate the potential impact that NAFS may have on the performance of windows if adopted by the window standards committee.

This work is underway and is anticipated to be completed by the end of 2002.

**CMHC Project Officer :** *Silvio Plescia*

**CIDN :** 2425 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ENERGY CONSERVATION

### ALTERNATIVE HOME ENERGY SOURCES FOR THE NORTH

This was a partnership project between Alaska Housing Finance Corporation, Arctic Energy Alliance and CMHC. Access to alternative energy in the North was an important issue identified in the 1998 Client Consultation ("What We Heard - in the North"). While much literature exists on alternative home energy sources, most of it is too complex for general comprehension. Further much of this information has not been verified for applicability to the North, including availability and performance of alternative energy products in the North. This project provides a full summation of options, a cost benefit analysis based upon present individual utility infrastructures



and costs, as well as regional climatic requirements, references, and contact information. This study consists of four parts:

1. a comprehensive section on how to best achieve optimal energy conservation within a home;
2. an overview of all home utility sources which access renewable energy sources;
3. community-specific spreadsheets containing all climatic information; and
4. spreadsheets to calculate community-specific cost-benefit analysis of any alternative home energy system specific to the climatic and utility cost data for a given locale.

This database will be periodically updated to gather accurate climatic data and to keep pace with evolving technologies to ensure accuracy in cost benefit calculations.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2312 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS

An energy and greenhouse gas emission simulator will be developed to model the impacts of energy efficiency measures on large buildings. The energy simulator will be capable of analyzing the impact of individual, or packages of, energy efficiency measures on the energy consumption and greenhouse gas emissions of large commercial and multi-unit residential buildings. Regional and national energy and greenhouse gas emission reductions will be assessed by using the simulator to evaluate the impact of energy efficiency measures on the buildings in a representative building database. The results of the analysis will then be projected to national levels to determine the extent of retrofit measures that are required within the building stock to meet the reduction targets set by the Kyoto Protocol in December 1997.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2249 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### CASE STUDIES OF MAJOR HOME ENERGY RETROFITS

To meet targets for greenhouse gas production in Canada, the residential sector will have to significantly reduce energy consumption in existing houses. A 1995 CMHC report suggested that houses built prior to 1989 will have to reduce energy consumption on average by about 40%. This is a big reduction, one that is rarely realized in programs funded by government or the utilities. The object of this research is to see whether relatively normal houses can have their total energy usage reduced by 40%. Saskatchewan Research Council has been hired to determine this. Five houses have been selected and the retrofits contracted by the owner were completed by December 2001. Monitoring through 2002 should establish whether the 40 % goal can be achieved.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2349 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### CHARACTERIZATION OF ENERGY AND WATER END-USE LOAD PROFILES IN HOUSING: LITERATURE REVIEW

CMHC, in cooperation with Natural Resources Canada, conducted a literature review of energy and water end-use load profiles, interior heat gain, monitoring and analysis methodologies in residential buildings. The project identified what data is available on energy and water end uses, research projects, data, monitoring protocols and published information relating to energy and

## ENERGY CONSERVATION

water load profiles of housing. The study concluded that consistent, accurate and detailed load profiling data is not available for all end-uses in dwellings, particularly multi-unit residential buildings. CMHC and NRCan plan to develop a load monitoring protocol that will be used to gather data in both single family and multi-unit residential buildings in consistent and systematic manner. Upon completion of the protocol, load monitoring projects will be conducted in dwellings across Canada.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2201 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is in the process of documenting the application of energy efficiency measures in multi-unit residential buildings to be used as case studies. A trial case study of a housing co-operative in Ottawa is underway, to not only assess the strengths and weaknesses of the energy efficiency measures implemented, but also to identify what information can be disseminated to others in the building industry. Upon completion of this first case study, CMHC will be soliciting the housing industry for additional energy efficiency case studies. A compendium of case studies will be made available from CMHC. The case studies will also support the Energy Efficiency Opportunities Manual for Multi-Unit Residential Buildings that CMHC is in the process of developing. The case studies currently underway include:

1. Conservation Co-op, Ottawa
2. Dual Fuel Heating System, Oshawa
3. Energy Efficiency Retrofit of an Apartment Building, Toronto
4. Case Studies of Interior Insulation Retrofits in Buildings with Solid Masonry Walls (CMHC "A" Building, Ottawa; Lofts Corticelli, Montréal; Karcher Building, Prince Albert)
5. The Complete Rehabilitation of the Broadview Apartment building.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1899 0200002-3

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ENERGY EFFICIENCY OPPORTUNITIES MANUAL FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC, in partnership with the Ontario Ministry of Municipal Affairs and Housing (OMMAH), has developed a manual that details energy and water efficiency measures for existing multi-unit residential buildings. The document is based on a manual originally developed by the Ontario Ministry of Housing in the early 1980's. The new manual offers proven, current energy efficiency measures for the building envelope, mechanical, electrical, and domestic hot water heating systems. A web-based version of the manual has been developed that has been installed on the CMHC web-site. Individual energy and water efficiency measures have been placed on the high-rise website as they are developed. The measures have been publicized as the energy and water efficiency "Tip of the Week" (<http://www.cmhc-schl.gc.ca/en/imquaf/himu/wacon/waensatip/index.cfm>). The production of the web-based, and translated, version has also allowed for a simultaneous final editing of the manual in preparation for publication.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1887 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ENERGY USE OF STRAW BALE BUILDINGS WITH COMPARABLE BUILDINGS OF CONVENTIONAL CONSTRUCTION

This survey compared the measured energy consumption of straw bale buildings with similar buildings of conventional construction. The contractor examined the billing data of eleven straw bale buildings that used measurable heating energy (gas, oil, or electric). He then modelled conventional buildings of the same interior dimensions built to BC Building Code, using the HOT2000 program. The results show that nine of eleven straw houses studied use less energy than their modelled counterparts, with the average reduction in the order of 20%. These savings are substantially larger than the possible errors due to computer modelling imprecision.

**CMHC Project Officer :** Don Fugler

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2441 0200003

**STATUS :** Ongoing

### EXPERIENCE OF EARLY ADOPTORS OF SMALL SCALE, GRID-CONNECTED RENEWABLE ENERGY SOURCE POWER PRODUCTION AND NET METERING POLICIES IN CANADA

This study is to investigate and document the experience of early adopters of small-scale, renewable energy source grid-connected independent power producers (IPPs) and to compile an overview of net metering policies across Canada.

**CMHC Project Officer :** Chris Ives

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2525 0201008

**STATUS :** Ongoing

**\*NEW\***

### HYGROTHERMAL MODELLING OF THE INTERIOR INSULATION RETROFIT OF A SOLID MASONRY BUILDING

In 1997, CMHC was involved in the renovation of a building with solid masonry walls. Part of the renovation involved the addition of insulation to the interior of the solid masonry walls. This retrofit technique is contentious within the construction industry as it is thought to cause wall durability problems due to freeze thaw cycles, interstitial condensation and thermally induced stresses. Monitoring of the project shows that the wall systems are thus far performing well. CMHC has engaged a consultant to use a hygrothermal modelling tool to assess the degree to which the tool can track the wall performance monitoring conducted to date and to assess the long-term performance of the retrofitted wall system. If the model can be configured to provide a reasonably accurate assessment of the heat, air and moisture regimes within the wall assembly, the project will be extended to assess the performance of the retrofit strategy under different environmental conditions.

**CMHC Project Officer :** Duncan Hill

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 1730 0300005

**STATUS :** Ongoing

### OPTIMIZING HEAT AND AIR DISTRIBUTION SYSTEMS WHEN RETROFITTING HOUSES FOR ENERGY EFFICIENCY

When a house undergoes energy upgrading, either by improving the envelope or the heating appliance, one factor often overlooked is the heating or ventilating distribution system. With support from the Program for Energy Research and Development (PERD), CMHC is undertaking



## ENERGY CONSERVATION

research into distribution system upgrades. The first stage of this work was a review of the performance characteristics of current and innovative distribution systems. The review established the operating characteristics of HVAC equipment and distribution systems, and the limitations of retrofitting existing heating systems. Three small projects evolved from the preliminary review. Contractors have been hired to look at:

- simplified furnace sizing calculations;
- the difference in heating system installation between a city with diligent inspection and one where inspection is minimal; and
- a demonstration of how to install forced air ducting in houses with no existing air distribution systems.

Reports will be produced on these three projects during 2003.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2440 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### RETROFITTING A CITY: A GUIDE FOR MUNICIPALITIES TO IMPLEMENT A BUILDING RETROFIT PROGRAM

The primary goal of this project was to help municipalities across North America improve energy efficiency in buildings and reduce their greenhouse gas emissions. Based on Toronto's successful Better Buildings Partnership Program the project produced this useable manual for designing and implementing municipal building retrofit programs to improve water and energy efficiency. Building retrofits can reduce greenhouse gas emissions by lowering energy consumption. Undertaken on a wide scale, retrofitting buildings can enhance the sustainability of urban centres by diminishing air pollution locally and slowing the rate of consumption of natural resources.

Building energy retrofits should follow a process which includes the following steps:

- Audit: a study of the building and the way it uses energy which leads to a definition of appropriate measures;
- Implement: the implementation of the measures including engineering, project management, subcontracting, and commissioning;
- Monitor: the monitoring and tracking of energy savings to be sure they are achieved as expected, and they are sustained.

This process, and the steps on which it is based, are described in detail throughout the manual.

*Designed and written by Bob Bach and Marjorie Lamb. Canada Mortgage and Housing Corporation, Enbridge Consumers Gas, and Ontario Power Generation sponsored the project. CMHC Project Officer: Brian Eames. Ottawa: CMHC, 2001. 44 pages*

**NOTE 1 :** Aussi disponible en français sous le titre : Rattrapage éconergétique d'une ville : guide proposant aux municipalités des moyens de mettre en oeuvre un programme de rattrapage des bâtiments

**NOTE 2:** No. 105 in the Research Highlights Socio-economic Series summarizes the results of the research and is available on the CMHC web site

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Product is available on the web

## ENERGY CONSERVATION

### SURVEY OF MULTI-UNIT RESIDENTIAL BUILDING CHARACTERISTICS AND ENERGY USE DATA

This project involved the collection of the physical and operational characteristics of 40 multi-unit residential buildings from all regions in Canada. Energy and water consumption histories for the past 2 to 3 years have also been collected for each building. The survey portion of this work is now complete. CMHC has developed a database (HiSTAR) to store the building files and to allow for the comparison of energy and water usage given building age, size, region, fuel type and occupancy. The building files will also be used in combination with an energy simulator-green house gas estimator to estimate the impact of upgrading the stock of multi-unit residential buildings in Canada. The database will be supplemented with additional buildings that CMHC will access in the course of other research projects.

Note: No. 01-142 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site. The title is: "Analysis of the Annual Energy and Water Consumption of Apartment Buildings in the CMHC HiSTAR database".

**STATUS :** Completed

**AVAILABILITY :** Research highlight is available

## FIRES & FIRE PREVENTION

### CANADIAN HOUSING FIRE STATISTICS

This project's purpose is:

1. to provide Canadian statistical benchmarks for fire safety in housing, including Aboriginal housing; and
2. to provide recommendations for Canadian housing fire loss and cost data that should be collected.

**CMHC Project Officer :** Mark Holzman

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2525 0201013

**STATUS :** Ongoing

**\*NEW\***

### CLEANING UP YOUR HOUSE AFTER A FIRE

After a Fire is a consumer publication being prepared to help homeowners deal with fire damage in their homes. This publication will explain the issues to be considered to restore the home and to ensure a safe, healthy environment for the occupants. It is intended to be a brief publication targeted to the consumer, but it will also be useful to fire departments, restoration contractors, and insurance companies.

**CMHC Project Officer :** Ken Ruest

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2298 0200001

**STATUS :** Ongoing

## FIRES & FIRE PREVENTION

### INVESTIGATION OF SMOKE CONTROL IN HIGH-RISES BY POSITIVE PRESSURE VENTILATION

A research project has been initiated to study the use of positive pressure ventilation (PPV) systems to contain and expel smoke from high-rise buildings during a fire emergency. PPV systems have been used in the U.S. in low-rise buildings. The system consists of a portable, high velocity fan which is used by the fire department to clear smoke from buildings in order to facilitate access to the fire and to aid in occupant evacuation. Preliminary studies have been conducted in multi-unit residential buildings but not in cold climates where stack effect may continue to dominate smoke movement. The research program is the result of a joint venture between CMHC, the City of Ottawa Fire Department and the Fire Laboratory of the Institute for Research in Construction of NRC. The ability of PPV to contain and clear smoke from exitways in high-rise buildings has been evaluated at the Fire Laboratory's full scale test building under both summer and winter conditions. Field testing of the ability of PPV systems to pressurize stairwells in high-rise buildings has also been performed. PPV may offer Fire Departments an effective, lower cost, life and property saving tool.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1983 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HEATING AND VENTILATION

### ANALYTICAL MODEL OF EARTH TUBE VENTILATION SYSTEMS

The objectives of this project are to determine the conditions under which exterior ground-buried ducts (earth tubes) can be used effectively under Canadian conditions, to determine heat and moisture gains and losses for these systems under Canadian conditions, to determine the potential contribution to improvement of energy and ventilation performance of Canadian housing; and to develop guidelines for builders regarding the application of these systems.

**CMHC Project Officer :** Chris Ives

**CIDN :** 2437 0200023

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ASSESSING THE PARAMETERS FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS

This research project will determine the ventilation requirements for apartments. Equipment and systems will be evaluated in their ability to meet such requirements in the context of building design, occupancy type and recent experiences in the application of ventilation systems in multi-unit residential buildings. Design and installation recommendations will be created for use by building designers. Technology gaps (e.g.; the absence of appropriate equipment) will also be identified for the benefit of future research and development efforts.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2271 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



### CAN/CSA F326-M91 (R1998), RESIDENTIAL MECHANICAL VENTILATION SYSTEMS

CMHC has been supporting the revision of Can/CSA F326-M91 (1998), Residential Mechanical Ventilation Systems, with a financial contribution to the Canadian Standards Association (CSA) to act as secretariat and through CMHC participation in the task group work of the Committee. There are some significant changes to be made to the standard. Some of the tasks may require help from outside consultants. The majority of the technical review should be complete by late 2002.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2062 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS

The objective of this project is to undertake a field investigation of the ventilation and infiltration in a residential high-rise building. CMHC, in cooperation with the Institute of Research in Construction, will monitor indoor-outdoor air pressure regimes in a high-rise for a period of one year. Ventilation system performance will also be assessed. Pressure regime measurements, in conjunction with measured air leakage characteristics of selected assemblies, will be used to estimate real-time air movement across the building envelope. This information will add to the body of knowledge governing infiltration-ventilation regimes and resultant heat load calculations in buildings.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1934 0200005

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### CHARACTERIZE THE PERFORMANCE OF A WATER LOOP HEAT PUMP SYSTEM IN A MULTI-UNIT RESIDENTIAL BUILDING

Two pipe water loop heat pump systems represent an innovative approach to heating and cooling multi-unit residential buildings. The system consists of a central water distribution system that distributes moderately warm water to each apartment in the winter and cool water in the summer. An in-suite heat pump fan coil unit is then used to heat or cool the apartment depending on the season using the central water loop as a heat source or a heat dump. In theory, the system will allow for simultaneous heating and cooling of different areas of the building by redistributing heat to where it is needed. This ability is thought to offer significant energy savings but the extent to which this may be the case has not been evaluated. CMHC is undertaking a project to characterize the performance of a water loop heat pump system in a multi-unit residential building in Ottawa so that the potential for energy savings can be assessed. The project will evaluate energy consumption and operational and maintenance issues over a one year period.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1899 0200007

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### COMPLIANCE OF VENTILATION SYSTEMS INSTALLED TO MEET THE JUNE 18, 2001 DRAFT OF SECTION 9.32 "VENTILATION" FOR THE NBCC: FINAL REPORT

A 1999 study on compliance of new residential ventilation systems found that few, if any ventilation systems were in full compliance with the Section 9.32 "Ventilation" in the 1995 National Building Code of Canada (NBCC). Of particular concern was the fact that Sub-section 9.32.3.8 "Protection Against Depressurization" appeared to permit levels of house depressurization which are not permitted for B-vented gas appliances under the B-149 gas code. The majority of study houses were within the depressurization limits defined in 9.32 but few would comply with the depressurization limit in B149. To address this issue, the Task Group reviewing Mechanical Ventilation for Houses for the NBCC Standing Committee on Houses has drafted proposed changes to the 1995 NBCC requirements for residential ventilation systems. These proposed changes are referred to as the June 18, 2001 Draft of Section 9.32.

UNIES Ltd. was contracted by CMHC to arrange for, inspect and test ventilation systems in ten houses with ventilation systems designed and installed by a heating contractor with the intent of meeting the June 18, 2001 Draft of Section 9.32. In September 2001, meetings were held with residential heating contractors in Winnipeg and Calgary to review the requirements in the June 18, 2001 Draft of Section 9.32 to provide them with background information on this project, and to encourage their participation in this project.

In December 2001 and January 2002, ventilation systems designed and installed to meet the June 18, 2001 Draft of Section 9.32 were inspected and tested. In all, five houses in Manitoba and five houses in southern Alberta were tested. This report provides a commentary on the differences between the 1995 NBCC Section 9.32 "Ventilation", response of installers to the proposed changes, a description and assessment of the ventilation systems installed to meet the June 18, 2001 Draft of Section 9.32 "Ventilation", and commentary as to how the ventilation systems installed comply with the 1995 NBCC Section 9.32.

*Prepared by Bert Phillips, UNIES Ltd. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2002. 32 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### CONSERVATION CO-OP CORRIDOR OVERHEATING REMEDIATION STUDY

The Conservation Co-op is an innovative multi-unit residential building that has adopted many advanced, or green, building practices in the design, construction and operation of the building. One of the features of the building is the use of passive cooling and solar shading to maintain comfortable summertime conditions in the building. Unfortunately, hot and humid conditions in the summer creates highly uncomfortable temperatures in the corridors and apartments of the building. Preliminary indications are that the heat recovery ventilation system for the building does not adequately ventilate the common spaces and may even contribute to overheating by delivering hot humid outdoor air to the building. A project has been launched to assess the ability of a temperature and humidity controlled auxiliary cross ventilation system in the corridors to improve conditions. Similarly, the rooftop HRV systems that supply air to the corridors and apartments will be investigated to determine if the supply air function can be deactivated when outdoor air conditions are too hot and humid and activated to take advantage of cooler outdoor conditions. The project will aid in the assessment of strategies to use night-time cooling to help maintain improved indoor conditions in multi-unit residential buildings without mechanical air-conditioning equipment.

**CMHC Project Officer :** Duncan Hill

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2271 0200004

**STATUS :** Ongoing

**\*NEW\***

## HEATING AND VENTILATION

### ELECTRIC BASEBOARD RETROFIT IN MULTI-FAMILY BUILDINGS

During the 1960's and 1970's, electric baseboard heating systems were a common space heating approach in multi-unit residential buildings due to low installation costs, minimal use of interior space and the relatively low price of electricity. As a result, approximately 50% of apartment buildings in Canada have electric baseboard heating. However, rapidly increasing costs of electricity, concerns over environmental damage associated with conventional generating stations and the very age of most electric baseboards in apartment buildings will necessitate the development of alternative space heating strategies. This project will investigate the feasibility of replacing the existing baseboard heaters with a fan-assisted hydronic baseboard of approximately the same size and shape or alternatively, radiant panels. It is envisioned that such a system would be less intrusive and would permit the use of a water-to-water, heat pump, which itself is smaller in dimensions and lower cost than the more common water-to-air heat pump.

**CMHC Project Officer :** Duncan Hill  
**Division :** External Research Program  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2525 0201009  
**STATUS :** Ongoing  
**\*NEW\***

### EVALUATION OF AN APARTMENT HEAT RECOVERY VENTILATION SYSTEM

An innovative heat recovery ventilation system has been developed and installed in an apartment building. The system is based on the use of low wattage fans, heat recovery and a simple air distribution system to meet the ventilation needs of individual apartments. The system will be evaluated in terms of airflow, noise, occupant perceptions of indoor air quality, and operation and maintenance requirements. This project will help to identify better approaches to ventilating multi-unit residential buildings.

**CMHC Project Officer :** Duncan Hill  
**Division :** Policy and Research Division  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2271 0200002  
**STATUS :** Ongoing

### IDENTIFICATION OF FUTURE OPTIONS FOR THE LEBRETON FLATS DISTRICT HEATING SYSTEM

In the early 1980's, a district heating system was installed in the Lebreton Flats area of Ottawa, as a part of the redevelopment of the former industrial land to high density residential use. The system was installed to demonstrate a European style, low temperature district heating system within the context of a North American housing development. Having operated in a cost-effective and reliable manner for the past 20 years, CMHC has initiated a project to investigate future options for the system that would be in keeping with the concerns and priorities of the system's clients and CMHC.

**CMHC Project Officer :** Duncan Hill  
**Division :** Policy and Research Division  
**AVAILABILITY :** Product is not yet available

**CIDN :** 2511 0200003  
**STATUS :** Ongoing  
**\*NEW\***



## NORTHERN HEATING AND VENTILATION SYSTEMS

This is a continuation of related CMHC research which is of particular need to the North. Adequate, appropriate and affordable means of ventilation and verification of manufacturers' claims need to be assessed using established CMHC methodology. Results will be critical in alleviating costly health and building damage due to lack of confirmed ventilation options. The report will be completed in 2002.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2420 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PERFORMANCE ASSESSMENT OF THE LEBRETON FLATS DISTRICT HEATING SYSTEM, OTTAWA, ONTARIO, CANADA

The Lebreton Flats district heating system, installed 20 years ago, is one of few examples of low temperature district heating systems in North America. The availability of fuel consumption and maintenance records for the system allowed for an assessment of the performance of the system over the last 20 years. The assessment found that the plant provides space heating and hot water at a cost competitive with individual building systems but without the requisite building space. The distribution system was considered to be in good condition, as minimal heat losses were noted. It was also determined that other heating options, such as conversion to individual boiler systems, would not be competitive with the existing system. This study demonstrates that over the long term, low temperature district heating systems can be attractive alternatives to conventional space and domestic hot water heating systems.

*Prepared by C.W. Snoek, Department of Natural Resources Canada, CANMET Energy Technology Centre, Community Energy Systems Group. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2001. 127 pages*

**NOTE:** No. 02-127 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

## POSITIVE PRESSURE VENTILATION FOR HIGH-RISE BUILDINGS

Positive pressure ventilation (PPV) is achieved by placing fans outside a building and blowing air into the structure. When appropriate openings or vents are used in the structure, the airflow produced by the fan exhausts contaminants to the outside. Fire departments have used PPV as a means to ventilate contaminated atmospheres after initial knockdown and extinguishment of a fire. In Ontario, the use of positive pressure ventilation is still relatively new. However, its use as a tool to improve conditions is being explored by a number of fire departments, including the Ottawa Fire Department.

In 1998, a joint project with Canada Mortgage and Housing Corporation, Ottawa Fire Department, Tempest Technology Corporation, the Co-operators Insurance and National Research Council Canada (NRC), was initiated to investigate the use of PPV to vent smoke from high-rise buildings. NRC's ten storey facility was used for the investigations.

## HEATING AND VENTILATION

In the initial phase of the project, baseline tests were conducted to determine the airflow through an open exterior stair shaft door and pressures in the stair shaft produced by the fans under non-fire conditions. A second series of baseline tests were conducted using propane burners to simulate conditions (temperature and CO<sub>2</sub> concentrations) produced by a fire. These tests were used to investigate the effect of various parameters, including vent area on the effectiveness of the PPV system. Subsequently, the PPV system was used to vent smoke produced by fires involving typical residential furniture (sofas and beds). In addition, a limited number of tests were conducted with sprinklered heptane pan fires to investigate the effectiveness of the system in venting cool smoke.

PPV system operations simulated included post-fire venting of a stair shaft and venting of a corridor on the fire floor during fire attack. Tests with the residential furniture were conducted under both summer and winter conditions to determine the effects of ambient temperature. The results of the test program are summarized in this report.

*Prepared by G.D. Loughheed, P.J. McBride and D.W. Carpenter. Ottawa: Institute for Research in Construction, National Research Council Canada, 2002. (Research Report 102) 96 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** On a loan basis only from: Canadian Housing Information Centre

## REDUCTION OF AIR INTAKE CONTAMINATION OF HIGH-RISE RESIDENTIAL BUILDINGS

In the study, entitled, 'Reduction of Air Intake Contamination of High-Rise Residential Buildings', buildings will be tested to determine optimal placement of air intake grilles for HVAC systems. The placement determination will be based on water flume tests and modeling of air movement around high-rise buildings given confounding factors such as the height and proximity of neighboring buildings. A literature survey of relevant research on air intake grille location and contamination potential will also be performed.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2305 0200009

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## STUDY OF NECESSARY CHANGES TO HARMONIZE STANDARDS REQUIREMENTS RELATED TO COMBUSTION VENTING

In the recent review of ventilation codes and standards, it became clear that standards from different agencies use disparate means of assessing whether a house chimney or vent is at risk. A contractor is examining the requirements from each standard and drafting appropriate code language to present to those committees. It would be ideal if all agencies used the same criteria in their specifications and inspections.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2492 0200005

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## HEATING AND VENTILATION

### TECHNICAL AUDIT AND RESERVE FUND STUDY, LEBRETON FLATS DISTRICT HEATING SYSTEM

The Lebreton Flats District heating system was commissioned 20 years ago to demonstrate the use of a low temperature district hot water heating system within the context of a high density North America residential neighbourhood. CMHC has initiated a project to assess the condition of the project's reserve fund with respect to its ability to fund major system repairs and renewal projects over time. The research will aid the project's management team in budgeting monthly reserve fund contributions to meet future needs of the district heating system.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2511 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

### BEST PRACTICE GUIDE - FIRE AND SOUND ASSEMBLIES FOR MULTI-FAMILY BUILDINGS

This document, targeted at designers of multi-family buildings, will provide the latest information on CMHC research into fire and sound partitions, floors, flanking, plumbing noise, etc. Construction details for fire and sound assemblies will be detailed. The document is being produced in collaboration with the NRC/IRC, and should be available this fall.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 1804 0200003

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### BEST PRACTICE GUIDE - WOOD FRAME ENVELOPES IN COASTAL CLIMATES OF BRITISH COLUMBIA

Building in B.C.'s coastal climate has special challenges -- and this revised guide is the most up-to-date, authoritative information available to help meet those challenges. This guide provides the most comprehensive technical information on how to build to withstand the conditions of B.C.'s coastal climate. The information includes behaviour of wood in construction, moisture source control strategies, heat flow mechanisms, typical envelope assembly characteristics, and materials for inclusion in specifications, quality assurance strategies, maintenance and renewal strategies and more than fifty-three state-of-the-art CAD details showing several air barrier strategies, all included on the companion CD-ROM. Endorsed by the Canadian Wood Council and the Building Envelope Research Consortium.

*Ottawa: Canada Mortgage and Housing Corporation, 2001. 258 pages + CD-ROM*

Order Number: 60959 \*\*Price: \$89.00 + GST and handling charges

NOTE : Aussi disponible en français sous le titre : Guide des règles de l'art : Enveloppe de bâtiments à ossature de bois dans le climat littoral de la Colombie-Britannique

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products



## BEST PRACTICE GUIDE FOR CURTAIN WALLS

The objective of this project is to develop a practical, advisory document for designers, architects and engineers, and manufacturers, related to curtain wall systems in housing applications. The curtain-wall is a well developed system in commercial applications but it requires special treatment when used in housing. The project will be conducted in partnership with curtain wall manufacturers and installers and their associations. This Guide will be produced as a joint publication through a collaborative project with Public Works Government Services Canada. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to curtain walls, construction details in AutoCAD format, outline specifications and additional sources of information and references.

**CMHC Project Officer :** Luis de Miguel

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2216 0200001

**STATUS :** Ongoing

## BEST PRACTICE GUIDE FOR EXTERIOR INSULATED FINISHED SYSTEMS (EIFS)

The objective of this project is to develop a practical, advisory document for designers, architects and engineers, and manufacturers, related to EIFS in residential applications. The project will be conducted in partnership with EIFS manufacturers and installers and their associations. This Guide will be produced as a joint publication through a collaborative project with the EIFS Council of Canada and the BC Wall and Ceiling Association. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to EIFS, construction details in AutoCAD format, outline specifications and additional sources of information and references.

**CMHC Project Officer :** Luis de Miguel

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2047 0200001

**STATUS :** Ongoing

## BUILDING ENVELOPE TEST HUT FACILITY PHASE 2 FEASIBILITY STUDY

CMHC has provided a financial contribution to the British Columbia Institute of Technology to undertake and complete a phase 2 feasibility study of a Building Envelope Test Hut (BETH). The project is expected to be completed by the end of 2002.

**CMHC Project Officer :** Silvio Plescia

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2384 0200002

**STATUS :** Ongoing

**\*NEW\***

## BUILDING RATING AND LABELING SYSTEMS

This project's objectives are to assess the changes that would have to be made to the 'LEED' rating system (owned by the US Green Building Council), to suit it to Canadian conditions; and to evaluate whether the existing Canadian 'Green Leaf' system (owned by ECD Canada), can readily be harmonized with LEED and whether it is likely to be able to function as a low-cost and simple complementary system.

**CMHC Project Officer :** Sandra Marshall

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2474 0200017

**STATUS :** Ongoing

# HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

## CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA

The number and characteristics of condominiums in Canada are unknown. This project reviewed Statistics Canada data files to estimate the number of condominiums in Canada, their location, age, number of storeys and number of suites based on the number of building permits issued since 1970. Using STATSCAN data, it was concluded that approximately 6,000 condominium buildings exist in Canada. Based on discussions with the Canadian Condominium Institute and other agencies, this estimate likely understates the number of buildings. The review also found that buildings could not be classified by the number of storeys nor number of units using STATSCAN data. Based on the outcome of this project, CMHC is in the process of developing another project to review the data available on condominiums within municipal files.

**CMHC Project Officer :** *Duncan Hill*

**CIDN :** 2277 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CONDITION SURVEY OF CONDOMINIUMS IN THE GREATER TORONTO AREA (GTA)

This project's objective is to carry out a condition survey of condominiums in the Greater Toronto Area. This project will be carried out in two phases. Phase 1 focuses primarily on data collection and development of research methodologies for examining topics related to both physical and social issues. Phase 2 focuses on conducting the surveys and completing the analysis of the state of repair of the buildings.

**CMHC Project Officer :** *Sandra Marshall*

**CIDN :** 2161 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR)

A database structure to house building characteristics, energy and water usage data for multi-unit residential buildings has been completed. The database, known as HiSTAR (High rise building Statistically Representative Database) is in MS ACCESS format. The database will be used to compile and analyze building energy and water data collected during CMHC's research projects which take consultants into high-rise residential buildings. The HiSTAR database will be used to generate fact sheets on energy and water use and will be used for the analysis of the potential impact of energy and water efficiency upgrades.

**STATUS :** Completed

**AVAILABILITY :** There will be no product for this project

### DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR) TASK 2: COLLECTION OF ADDITIONAL BUILDING FILES FOR THE HISTAR DATABASE

CMHC has commissioned a research project to gather information to characterize the energy and water consumption patterns in multi-unit residential buildings. This data will be used to supplement the data contained in the CMHC HiSTAR database. The HiSTAR database is used to baseline water and energy use in multi-unit residential buildings and is also used to evaluate the impact of building and occupancy characteristics and location on energy and water use.

**CMHC Project Officer :** *Duncan Hill*

**CIDN :** 2366 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### FIRE AND ACOUSTICAL PERFORMANCE OF FLOOR ASSEMBLIES - PHASE II

A continuation of an earlier project, this phase will be carried out over 4 years with a total budget of \$2.2 million. A dozen industry and government partners have formed a consortium with the National Research Council of Canada to complete testing of several types of assemblies for residential construction. Results will be incorporated in the National Building Code of Canada. Both full and small scale fire and sound testing will be carried out. A large database will be developed which designers and builders can use for reference. Particular attention will be given to assemblies likely to just obtain an STC 50 rating.

**CMHC Project Officer :** *Luis de Miguel*

**CIDN :** 2375 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS

Investigations of previously retrofitted solid masonry walls have been performed to determine the impact that the interior application of insulation has on the durability of the walls. The findings of the investigations will be published as case studies. Case studies will include a 120 year old solid masonry building in Montreal that was insulated 15 years ago by the application of spray applied polyurethane insulation on the interior of the walls, a 50 year old solid masonry office building in Ottawa that was insulated on the interior 8 years ago and several 1900's vintage apartment buildings in the Ottawa area. Preliminary indications are that the interior application of insulation has not adversely affected the durability of the masonry walls of the case study buildings but further investigation will be required to confirm that this conclusion generally holds true for other buildings.

**CMHC Project Officer :** *Duncan Hill*

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



### HEALTHY HIGH-RISE : A GUIDE TO INNOVATION IN THE DESIGN AND CONSTRUCTION OF HIGH-RISE RESIDENTIAL BUILDINGS

This document is designed to reflect the innovation that can lead to the design and construction of better performing buildings. It provides:

- an overview of many of the problems affecting high-rise buildings which result from conventional practices;
- insight into an improved understanding of the building science principles; and
- design considerations for improved building performance in a variety of areas.

The document is intended to present alternative ways of thinking about design principles for high-rise buildings, to provide some different approaches to design and construction, commissioning and operations and maintenance. In many cases, it presents the need for a more holistic and integrated approach to the design and construction of a high-rise residential building. Issues related to retrofit opportunities and regional differences are also discussed when they apply.

Opportunities are also discussed for improving the integration of high-rise residential buildings with the surrounding urban infrastructure, including on-site systems for energy and water supply, transportation and waste management. Finally each section includes "Sources of Information" to recent research and development studies. The guide is designed for architects and other building design professionals.

*Prepared by: The Shekair Group, Société Logique Inc., Paul Kernan, architect. Ottawa: Canada Mortgage and Housing Corporation, 2001. 153 pages*

**Note:** Aussi disponible en français sous le titre : Tours d'habitation saines

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

### INVESTIGATION PROTOCOL FOR EVALUATION OF POST-TENSIONED BUILDINGS

There is more than one billion square feet of concrete structures which utilize unbonded post-tensioned reinforcement in North America. In general, these buildings perform well provided that moisture access to the unbonded post-tensioned reinforcement is avoided. However, buildings constructed in this manner do require special evaluation techniques to avoid misdiagnosis that can lead to inappropriate, expensive, or unnecessary repairs. Alternatively, serious safety issues may be left undiscovered if the evaluation program fails to recognize the unique issues related to unbonded post-tensioning systems. The purpose of this document is to provide an understanding of the unique technical requirements for investigation and maintenance of buildings with unbonded tendons. It is intended that this document be a guide for owners, property managers, and others with an interest in real estate, to develop consistent standards and expectations for the assessment and maintenance of unbonded post-tensioned structures.

*Prepared by John Harder, David Rogowsky, and Anast Demitt. CMHC Project Officer: Silvio Plescia. Ottawa: Canada Mortgage and Housing Corporation, 2002. (External Research Program Research Report) 46 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING

This project will describe load profiling work underway in Metro Toronto Housing Corporation multi-unit residential buildings. The project will characterize thermal, electrical power and water requirements in the apartment buildings and will also identify technical issues encountered in load monitoring and data interpretation. This project is being used as a pilot project to identify the factors that will have to be considered in a larger project being planned by CMHC and Natural Resources Canada to assess the energy and water load profiles in low and high-rise housing.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2201 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS

The purpose of this project is to develop knowledge to assess the impact of various wall design and indoor-outdoor environmental conditions on the durability and energy efficiency of new and retrofitted high-rise residential and commercial building systems. The hyglRC heat, air and moisture model developed by the Institute for Research in Construction is being used to model common wall systems. Retrofits to improve the airtightness and insulation levels in the walls were developed and are being applied to the basic wall systems. The hyglRC model will simulate heat, air and moisture conditions within the retrofitted walls to determine how the retrofits affect the durability of the wall system. This information will be used as a means to confirm the integrity of several specific retrofit measures developed for high-rise wall structures before they are recommended to the building industry.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1934 0200003

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### MONITORING INNOVATIVE MECHANICAL AND ELECTRICAL SYSTEMS

The innovative mechanical and electrical energy producing systems in a multi-unit residential buildings project in Toronto were monitored and assessed to determine their economic viability. The project involved the assessment of the buildings cogeneration, space heating, absorption chilling, domestic hot water and ventilation systems and a review of natural gas and electricity use. The cost of energy provided to the building by the cogeneration system in terms of fuel consumption, maintenance expenditures, avoided electrical use and other considerations was determined. An inspection of the individual space conditioning systems within the suites was also performed. The findings of the investigation showed that the operation costs (fuel use, maintenance and repair) of the cogeneration system was not economically viable. Key findings include the observation that the system was not making full use of the heat generated by the cogeneration systems. The report estimated that even if all of the heat was recovered from the cogeneration system, the benefit of the system to the building's owners would be marginal. Given that the building embodies some of the most advanced technologies that allow for energy efficiency, cascading and recovery, operation costs should have been low relative to conventional buildings.

CMHC coordinated a meeting of the project developer, engineering design team, cogeneration system manufacturer, utility representative and industry experts and stakeholders to review the situation in the building and to determine whether or not the performance of the building systems could be improved. The outcome of the meeting was that a review of the utility meters and billing history should be undertaken to confirm that the basic information being used to assess the performance of the building is correct.



## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

The review found that the buildings had many questionable energy loads that could not be easily explained. It was suspected that the electric ramp heater was not operating correctly. Similarly, one of the buildings of the project had twice the energy use of the other building but the reason for this is not clear. The project also found problems with the meters used to monitor electricity use by the commercial units on the ground floor. It was determined that the meters significantly underestimated use. Based on the outcome of this project, the building owners will be conducting further investigations.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1260 0800001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PERFORMANCE OF AN INNOVATIVE HIGH-RISE RESIDENTIAL BUILDING

CMHC is monitoring the performance of a recently constructed multi-unit residential building that implemented many of the most innovative building technologies developed to date. The building features a durable, airtight and highly insulated building envelope, combination space and domestic hot water heating systems in each apartment, individual heat recovery ventilators in each apartment, thermally isolated balcony slabs, a heat recovery system for corridor ventilation and garbage room odour containment. The monitoring project will assess the performance of the building envelope, the space and domestic hot water heating systems and the efficiency and effectiveness of the ventilation systems. Air movement throughout the building will also be assessed. To date, the building has been air tested to assess its air leakage characteristics. The tests showed that the building is one of the most airtight multi-unit residential buildings constructed in Canada. Energy and water monitoring has shown that the building consumes approximately one half of the average energy and water used in conventional apartment buildings.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2147 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## REPAIR AND RETROFIT CASE STUDIES OF THE LOFTS CORTICELLI COMPLEX

A field project to review the condition of the solid masonry walls of a historic building in Montréal has been completed. The building, originally constructed in the 1800's, was converted to residential use in 1986. As a part of the renovation, the interior of the solid masonry brick walls was insulated with spray applied polyurethane foam and fibreglass batt insulation. As this type of insulation retrofit was thought to be responsible for the deterioration of solid masonry walls, CMHC initiated a project to assess the condition of the building envelope and all of the elements. The field survey found that the walls, after 14-15 years of service, were in good condition. No conditions or symptoms were found that would lead to the conclusion that the application of the spray applied polyurethane foam and other finishing materials had, in anyway, undermined the integrity of the wall system. This finding is important as many older buildings in the urban areas of Canada are being renovated to residential use and exterior insulation retrofits are not possible for heritage or aesthetic reasons. While the finding of this study is specific to this one building, it appears that interior insulation wall retrofits may be possible as long as steps are taken to prevent the intrusion of moisture and air leakage from both interior and exterior sources into the wall assembly. Susceptible wall members, such as embedded wood structural members should be protected as well. CMHC will perform additional case studies of retrofitted solid masonry walls to provide a better understanding of the strengths and weaknesses of this form of renovation.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 1782 0300020

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

### REVISIONS TO BRICK VENEER STEEL STUD BEST PRACTICE GUIDE

The objective of this project is to produce a revised version of CMHC's Brick Veneer Steel Stud Best Practice Guide.

**CMHC Project Officer :** Luis de Miguel

**CIDN :** 2378 0200003

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### STUDY OF HIGH-RISE ENVELOPE PERFORMANCE IN THE COASTAL CLIMATE OF BRITISH COLUMBIA

In recent years, there have been significant efforts to understand and resolve moisture ingress and deterioration problems associated with wood-framed, low-rise building construction. Currently, this problem is acute in some wood-frame condominiums in the Lower Mainland of British Columbia. There are indications that the high-rise stock may also be experiencing similar moisture problems. The objective of this project was to examine the files of a sample of thirty-five buildings to identify causal relationships that have resulted in building envelope problems and successes in non-combustible high-rise residential buildings in the coastal climate of lower mainland BC. This was done by correlating building envelope performance with sources of moisture, and features of design and construction of assemblies and details. The project did not estimate the extent of a potential problem. The project focused specifically on envelope details and envelope systems that have failed, rather than building failures. Envelope types and components under review included window/wall assemblies and light-gauge steel stud (back-up) wall assemblies with stucco, masonry and EIFS cladding systems. Project funding has been provided by Canada Mortgage and Housing Corporation in partnership with the Homeowner Protection Office, the City of Vancouver, the EIFS Council of Canada and Vancouver Condominium Services Ltd.

*Prepared by RDH Building Engineering Limited. CMHC Project Officers: Mark Salerno, Silvio Plescia. Ottawa: Canada Mortgage and Housing Corporation, 2001. 1 CD-ROM*

**NOTE:** No. 02-120 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed CD-ROM and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

### TECHNOLOGY ROAD MAP FOR INTELLIGENT BUILDING TECHNOLOGIES

The objective of this project is to develop a road map for intelligent building technologies, considering the potential technological, societal and other developments that will affect the industry within the next five years.

**CMHC Project Officer :** Sandra Marshall

**CIDN :** 2388 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOME OWNERSHIP

### CONDOMINIUM BUYER'S GUIDE

This guide is being developed to assist buyers in choosing a condominium which meets their personal and financial needs. The guide will provide buyers with an overview of the operation of different condominiums and important questions to address when choosing a condominium to meet the lifestyle and financial needs of the buyer. In addition, the guide will provide guidelines on evaluating the financial and physical status of an existing condominium. Information on evaluating the physical condition of the individual unit, the condominium building and grounds, and the financial status of the condominium will also be covered. Contact information for acquiring additional information and assistance will be included.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2514 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSE CONSTRUCTION

### ALTERNATIVE WALL SYSTEMS FOR LOW-RISE RESIDENTIAL CONSTRUCTION

The purpose of this study was to research ten alternative wall systems for low-rise housing in use today. These systems included insulated concrete forms, straw bale, structural insulated panels, stack wall, concrete block, post and beam, log, earth construction, manufactured wood, and lightweight steel. The results of this study will be beneficial to those in the industry to help them make better informed decisions on choices between alternative systems. This study investigated the differences, benefits and limitations of the various building systems which are currently in use as compared to the typical wood-frame, stick-built construction of low-rise housing. It considered the benefits and drawbacks of the various systems. The study examined a number of the factors to be considered by a builder or homeowner to help them understand the differences between the available system choices so they may evaluate and select systems appropriate to their clients, house designs, trade practices and skills, and regions. The study included reviews by industry representatives.

**NOTE:** No. 02-132 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Research Highlight

**AVAILABILITY :** CMHC Information Products and on the CMHC web site

### BUILDING ENVELOPE SOLUTIONS - THEORY AND PRACTICE

This was a partnership project between the Canadian Home Builder's Association of British Columbia (CHBA/BC), the Homeowner Protection Office (HPO) of B.C. and CMHC. The purpose of the project, previously called "Builders ToolBox", was to develop materials which would be used to train general contractors and subtrades in building construction practices that would enable them to construct highly durable building envelopes for new residential wood-frame buildings located in the lower mainland of British Columbia and Vancouver Island and to restore and upgrade the envelopes of existing buildings. The end product is a manual divided into 11 modules: Introduction; Building Science; Results of Survey of Buildings in the Lower Mainland; Condensation Control in

## HOUSE CONSTRUCTION

Wall Assemblies; Rain Penetration Control in Wall Assemblies; Sheathing, Sheathing Membranes, Claddings and Flashings; Windows and Doors; Roofs, Decks, Walkways and Balconies; New Construction of the Building Envelope; Restoration of the Building Envelope; and Regulatory Requirements and Standards. The material can be tailored to meet the various needs of the residential construction industry in B.C. The course is currently being offered by the British Columbia Institute of Technology.

**STATUS :** Completed

**AVAILABILITY :** Seminar/training is available

### CANADA'S CONSTRUCTION SYSTEM. ABOUT YOUR HOUSE; CE42

The purpose of this fact sheet is to foster understanding of the elements of the system of construction, and operation of buildings and houses in Canada. The fact sheet outlines the systems to help determine what should be built, systems for quality control, systems to improve business and technical knowledge, systems to allocate responsibility, systems for recourse, systems to respond to problems and systems for keeping up to date.

*Ottawa: Canada Mortgage and Housing Corporation, 2002. 8 pages*

Order number: 62966

Note : Aussi disponible en français sous le titre : Système de construction Canadien

**STATUS :** New Completed Fact Sheet

**AVAILABILITY :** CMHC Information Products and on the CMHC web site

### COMPARING THE PERFORMANCE OF TWO-COAT VS THREE-COAT STUCCO

CMHC through its Prairie and Northwest Territories Business Service Centre in Calgary is supporting this Alberta Housing Industry Technical Committee (AHITC) research project.. The research will use laboratory and field testing to compare the performance of two coat stucco commonly used in the Prairies and standard three coat stucco. If they perform similarly, building code changes may be recommended. The contractor has completed the review of test procedures and has undertaken the laboratory work. Two coat stucco did not have the same strength in laboratory testing as code-required three coat. Field tests are being organized to see if two coat stucco applied to actual houses is performing as well as three coat.

**CMHC Project Officer :** Don Fugler, Colin Crumb

**CIDN :** 2399 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### DEVELOPMENT OF AN INSTRUCTOR'S GUIDE AND AN ACCOMPANYING PRESENTATION FOR RESIDENTIAL GUIDE TO EARTHQUAKE RESISTANCE

The objective of this project was to develop a course to advocate the importance of, and to convey knowledge on making houses more resistant to earthquakes. There will be two courses developed. The first one, which was developed in partnership with the British Columbia Institute of Technology (BCIT), is approximately 18-24 hours in length and will be targeted to designers, builders and renovators. It covers information on construction techniques to better prepare housing to withstand an earthquake. The second course, which will be developed in-house by CMHC staff from the long course, will be approximately 6 hours and targeted to a general audience of consumers. It will address consumers' concerns regarding the durability of their housing during disasters. The development of the industry course is completed and is to be piloted through



## HOUSE CONSTRUCTION

BCIT this Fall and Winter, 2002. Following the pilot any required modifications will be made to the course material.

**CMHC Project Officer :** Darrel Smith, Mark Salerno

**CIDN :** 2517 0200001

**Division :** Policy and Research Division

**STATUS :** Completed

**AVAILABILITY :** Seminar/training is available

### FEASIBILITY OF DEVELOPING A BUILDING CANADA PROGRAM

The purpose of this project by EnerQuality Corporation is to examine the feasibility of developing a Building Canada program similar to the Building America model. To be effective, the Canadian program needs to be of interest to Canadian builders and recognize the different environment by responding to their real needs, i.e., reducing construction costs, customer callbacks, warranty claims, construction time, and construction waste, while at the same time improving the energy efficiency of their new houses. The program will result in little or no additional cost for the builder and where ever possible a reduction in costs. This study is a necessary first step to determine if a Building Canada program is viable and could be established in Canada. It will draw from the experience of the Building America program as well as the results achieved in a pilot of this program with two large Canadian builders. This project is being managed by EnerQuality Corporation on behalf of a consortium of partners including: CMHC, Enbridge Consumers Gas, Union Gas, Owens Corning, and Natural Resources Canada. Once this initial program design phase has been completed, and if found feasible, the program will be launched and expanded as part of subsequent phases.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2387 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### FEASIBILITY STUDY ON THE DEVELOPMENT OF A COMMISSIONING GUIDE FOR NEW HOUSES

The purpose of this project was to assess the importance and determine the feasibility of developing a commissioning guide for builders and buyers of new houses. The research indicated that generally home builders do not currently carry out a whole house commissioning and do not have a protocol to do so. However with houses becoming more complex, there is greater need to have a competent person investigate the whole house and all its systems to ensure they are installed and functioning as originally designed before delivery to the buyer. To be effective and useful, the commissioning guide must be simple to use and yet comprehensive. It must not add significantly to the cost of the house. Commissioning should not be a duplication of services already in place. The guide should include a review of the installation and operation of all major components and systems of the house. The study found that the benefits of the house commissioning process are that:

- houses perform better;
- homeowners are assured the house is built as expected according to the plans and specifications and the components and systems have been installed and are functioning properly;
- homeowners are better informed about the systems in their houses and how they work (resulting in less call backs for contractors); and
- potential problems are identified before damage occurs (also resulting in less call backs for contractors and reduced costs for warranty programs).

The study identified a need and found interest by clients and stakeholders in the development of a commissioning guide. As a result, CMHC is considering the development of a commissioning guide.

## HOUSE CONSTRUCTION

Prepared by Buchan, Lawton, Parent Ltd. Prepared for Canada Mortgage and Housing Corporation. CMHC  
Project Officer: Darrel Smith. Ottawa: Buchan, Lawton, Parent Ltd., 2001. ca. 100 pages

**STATUS :** Completed Report

**AVAILABILITY :** on a loan basis from Canadian Housing Information Centre

### RESEARCH ON SOLUTIONS TO PYRITE-RELATED BACKFILL EXPANSION PROBLEMS

This study will draw up an inventory of the problems associated with the reactions of the pyrite (iron sulphide) contained in the backfill stone used under slabs in residential properties. Two hundred houses inventoried in three Montréal South-Shore municipalities will be visited under the CTQ-M200 protocol developed as part of the work of the Quebec technical committee on pyrite-related problems. The results of the study will identify possible causes and potential affordable solutions. The objective is to provide the industry with a more global vision of this new situation.

**CMHC Project Officer :** Jacqueline Meunier-Bureau

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### SEISMIC UPGRADES TO LOW RISE HOUSING

Design and construction practices have indirectly resulted in a progressive decline in the earthquake (seismic) performance of a majority of residential wood frame buildings of more than one storey in height. This work will identify practical, cost-effective changes in current residential wood frame construction and retrofit design and practice that will substantially reduce vulnerability to damage during strong earthquake events. Results from this research are expected by the Spring of 2003.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2538 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### WOOD USAGE IN STRAW BALE HOUSE CONSTRUCTION

This is another in a series of small projects assessing the acceptability of straw bale walls for housing. The contractor totaled the wood used during the construction of his load-bearing, straw bale building, and then compared it to a simulated, conventional building of the same size and design. In this simple design, without interior partitions, the straw building used over 45% less wood than the corresponding conventional house. This study uses the straw bale building type that is most likely to show an advantage. For straw bale houses using post and beam construction, or having significant interior framing, wood savings would be much reduced.

Research Contractor: Scott Pegg, Eco-Way Living Group Inc. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2002. (Research Highlights; Technical Series; 02-116) 2 p.

NOTE : Aussi disponible en français sous le titre : L'utilisation de bois dans la construction de maisons en ballots de paille

**STATUS :** Completed Research Highlight

**AVAILABILITY :** CMHC Information Products and on the CMHC web site

## HOUSE CONSTRUCTION

### WORKSHOP ON WOOD CONSTRUCTION DETAILING

This project's purpose is to produce material for a one-day workshop on wood frame detailing for new buildings, addressed to architects, engineers and designers, with a focus on durability, buildability, acoustic performance and fire safety, based on a variety of CMHC publications.

**CMHC Project Officer :** Luis de Miguel

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2534 0200001

**STATUS :** Ongoing

**\*NEW\***

## HOUSING DESIGN

### DESIGN MULTIPLE-UNIT CHUM'S AND MODULAR HOUSE PACKAGES FOR URBAN AND SUBURBAN, REMOTE AND NORTHERN COMMUNITIES

The purpose of this project is to support the preparation of design drawings, construction specifications and cost estimates for several Multi-Unit CHUM's (Containerized Heat and Utilities Modules), and for matching Modular House Designs that would integrate with these CHUM's, specifically for the suburban and rural, remote and northern communities contemplated. A CHUM provides on-site utility services for housing. The project is about 85% complete - a draft version of a design manual has been produced in both a printed format and as a CD-ROM. The project has been delayed in part due to difficulties in establishing candidate sites for demonstration and/or commercial application. The manufactured housing industry has been a key participant/supporter of this project.

**CMHC Project Officer :** Chris Ives

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2407 0200001

**STATUS :** Ongoing

### FLEXHOUSING FEATURES COST COMPARISONS - IN A BENCHMARK HOUSE DESIGN

Flex housing is affordable, adaptable and accessible housing. It takes extra planning time, but the pay-off is a comfortable home that will satisfy the occupants' changing needs over its lifetime. This project shows the breakdown of costs involved in building with many of the FlexHouse options, as well as the cost to renovate an existing house to give it those qualities. Costs were determined in Saskatoon in 2002.

No. 109 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Research Highlight

**AVAILABILITY :** CMHC Information Products and on the CMHC web site



### MONTREAL: A RICH TRADITION IN MEDIUM-DENSITY HOUSING

This report presents facts, findings and new hypotheses on the origins and evolution of Montreal's housing tradition which developed primarily during the 19th century. The local "plex" building typology is identified:

- first as a multi-family structure sheltering from two to six dwellings, each with through access from the front to the rear of the buildings;
- second as a housing type adapted to a dominant rental market;
- thirdly as a thoroughly urban built form, laid out in rows of two to four storeys, marking an intermediate building type between the "dwelling house" and the "tenement".

These three characteristics produced a medium-density housing environment which today provides sought-after urban dwellings known for their flexibility in adapting to different household types, needs and means. It also presents a sensible example of urban dwelling between the single-family house and high-rise towers. The report proposes new hypotheses on the sustaining historical conditions underlying the development of the "plex" and the influences on its built form, a practical tale of the transfer and contribution of French and Scottish housing patterns in Canada.

*Prepared by David B. Hanna and François Dufaux. CMHC Project Officer: Brian Eames. Ottawa: Canada Mortgage and Housing Corporation, 2002 (External Research Program Research Report) 187 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### QUANTIFYING UNIVERSAL DESIGN: A PROGRAM FOR IMPLEMENTATION

This research project was to identify methods to acquire the pragmatic information needed to further the principles of universal design. These principles of flexibility, ease of use, etc. were validated with some modifications. As in previous research, the concepts inherent in universal design were seen as critical, appropriate and useful to create more inclusive environments.

The methodology for this project featured a literature search, the preparation of a discussion paper, and a meeting with people with diverse expertise discussing questions related to develop methods for collecting and organizing information to promote universal design.

The literature review found that most current dimensional information fails to meet criteria developed from a universal design perspective. In particular, people with disabilities, people 65 years and older, children, and pregnant women were under-represented in the samples and in the types of dimensional information available. As well, the information that was available was usually presented as separate from the 'general population' rather than integrated into inclusive databases.

The final report includes a summary of the meeting discussions with a description of a proposed methodology, discussion of resources needed to implement such research projects, and the organization of a database. The appendices include a glossary, the background discussion paper with a literature review synthesis, and the list of consultants.

*A report of a workshop, October 13-14, 2001, Winnipeg, Manitoba. Researched and prepared by F. G. Consortium, Gail Finkel & Yhetta Gold in collaboration with Betty Havens, Juliette Cooper. Ottawa: Canada Mortgage and Housing Corporation, 2001. (External Research Program Research Report) 54 pages*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## INDOOR ENVIRONMENT

### ACHIEVING HEALTHY INDOOR ENVIRONMENTS: A REVIEW OF CANADIAN OPTIONS

There is convincing evidence that poor indoor air quality (IAQ) is damaging people's health. It has been linked to increases in asthma, allergies and multiple chemical sensitivities. In fact, the United States Environmental Protection Agency has rated poor IAQ as being among the top environmental risks to human health.

With funding from Canada Mortgage and Housing Corporation and five other project sponsors -- Venmar Ventilation Inc., NIKE Inc., Health Canada, Interface Flooring Systems (Canada) Inc. and Lever Pond's -- Pollution Probe has produced a report bringing together, for the first time, components of the indoor environment issue previously treated separately. This report looks at strategies for encouraging voluntary initiatives, best practices in the field, legal aspects of IAQ, and the market for indoor environmental products and services.

The report is organized into four parts. The first part briefly outlines why progress has been slow on resolving indoor environment issues, identifies key elements of effective indoor voluntary initiatives and describes a new strategy of "Maximum Voluntary Initiatives." The second part of the report provides an in-depth review of twenty voluntary initiative case studies. The third part of the report provides a summary of the legal aspects of IAQ. The fourth part of the report contains an overview of the Canadian indoor environment industries, including the identification of market drivers and key barriers to future industry development. This section contains recommendations for supporting local suppliers of products and services to the indoor environment.

Each part of the report recommends options for creating healthier indoor environments in Canada. At the core of the recommendations, and of the ideas reflected in the report, is the need for a comprehensive strategy to address the indoor environment issues in Canada.

*Prepared by Ian Morton of Pollution Probe and Jay Kassirer of Cullbridge Marketing and Communications. Toronto: Pollution Probe, n.d. 230 pages.*

NOTE: No. 02-105 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Report and Research Highlight

**AVAILABILITY :** Final report is published and distributed by Pollution Probe Foundation (416) 926-1907. Research Highlight is available on the CMHC web site and from CMHC Information Products

### BONHEUR DU BON AIR - ALONG WITH THE DRAFTING OF AN ACCOMPANYING BOOKLET

This project's objective is the production of a CD entitled "Le bonheur du bon air", along with the drafting of an accompanying booklet.

**CMHC Project Officer :** Jean Rattelle

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2463 0200002

**STATUS :** Ongoing

## HEALTHY INDOORS: ACHIEVING HEALTHY INDOOR ENVIRONMENTS IN CANADA

Many indoor environments in Canada were just as polluted in 2001 as they were 30 years earlier, despite numerous conferences and reports on the subject since the 1970s. Several leading US authorities, Canada Mortgage and Housing Corporation, and others have consistently identified indoor pollution as posing one of the most serious health risks.

The situation in Canada has developed largely because there are no clear structures or national strategies for addressing indoor environments. In contrast to outdoor environment issues, government policy on indoor environments is limited and fragmented.

To address this issue, Pollution Probe launched "Healthy Indoors" in cooperation with a wide range of government, non-government and industry stakeholders. "Healthy Indoors" includes 12 sponsors and 30 supporting partners interested in developing a collaborative and comprehensive multi-stakeholder strategy for creating and maintaining healthier buildings in Canada between 2002 and 2020.

This final report is a compilation of a multi-year effort to develop and implement a strategy for creating healthier indoor environments in Canada. Specifically, the report identifies 15 action items that form the basis of a strategic direction for achieving healthy indoor environments in residential, commercial and institutional settings. The report presents the rationale for each action item; provides an implementation plan; identifies the players; proposes timing; indicates who is responsible for monitoring; and states how performance will be reported. The linchpin of the recommended actions and the ideas contained in the report is the need for an indoor environment secretariat to advocate on behalf of, coordinate activities for, monitor, and expand the number of organizations and individuals working for health indoor environments in Canada.

*Prepared by Ian Morton of Pollution Probe and Jay Kassirer of Cullbridge Marketing and Communications. Toronto: Pollution Probe, 2002. 49 pages*

NOTE: No. 02-125 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

**STATUS :** New Completed Report and Research Highlight

**AVAILABILITY :** Final report is published and distributed by Pollution Probe Foundation (416) 926-1907. Research Highlight is available on the CMHC web site and from CMHC Information Products

## INDOOR AIR POLLUTION FROM ATTACHED GARAGES

CMHC contributed to a Health Canada/Environment Canada project investigating the infiltration of garage-based pollutants into houses. Twenty-five Ottawa houses have been tested to determine the leakage area between the house and the attached garage. Pressure differentials were recorded and pressure testing was repeated during the winter months. Further field testing took place in the winter of 1998/99, including modeling of the IAQ implications and monitoring of pollutant entry when the garage is occupied by a "calibrated" car. Modelling of results showed that one proposed solution, garage exhaust fans, could be effective in some houses but near useless in others. The research is being published in various peer-reviewed publications during 2002. CMHC released a Research Highlight (Technical Series 01-122) on the airtightness testing aspect of the project in summer 2001. Additional testing will start in late 2002, with twenty additional houses being airtightness tested in each of two additional cities. The new study will also look at the measured effectiveness of measures to reduce garage to house air movement.

**CMHC Project Officer :** Don Fugler

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 1910 0200002

**STATUS :** Ongoing



## POUSSIÈRE DOMESTIQUE : UN OUTIL EFFICACE ET ABORDABLE D'ÉVALUATION DE SALUBRITÉ MICROBIENNE RÉSIDENIELLE : RAPPORT FINAL

In the Greater Montréal area, in 2000 and 2001, the microbial content of the dust of 68 "healthy" homes with no water damage and no occupant health symptoms was compared to that of 145 "unhealthy" homes with major water damage. The average mould counts are seven times higher than in the unhealthy homes. The distribution of mould in healthy homes, with a predominance of genera like *Cladosporium* and *Alternaria*, differs from that in unhealthy homes, with genera such as *Penicillium* and *Aspergillus*. These results show that the mould content of the dust in a home is an indicator of its degree of microbial health.

*Prepared by Marie-France Pinard, Laboratoire MICROVITAL. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Ken Ruest. Ottawa: CMHC, 2002. (External Research Program) ca. 29 pages*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## PRINCE EDWARD ISLAND BIRTH COHORT STUDY OF MOLD IN HOMES

This joint study between CMHC, Carleton University, Health Canada and others is examining a large sample of homes in Prince Edward Island to determine the biological exposure, house performance parameters and energy use characteristics of a statistically-representative set of houses occupied by newborn babies. Part of the study will follow the health of these babies to determine the degree to which damp and moldy houses result in increased infant health problems. A total of 291 houses have been tested at the end of the fifth year of the project. An additional 75 houses are to be tested during winter 2002-2003. Due to the long term nature of this research, research reports have not as yet been issued.

**CMHC Project Officer :** Ken Ruest

**CIDN :** 1618 0300001- 2

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RENOVATING THE HOME FOR ASTHMA: AN INTERVENTION STUDY

The purpose of this project is to study the relationship between air quality in housing and respiratory health. Health Canada, Carleton University and Natural Resources Canada are partners and are represented in the project advisory committee. Funding is from CMHC, with contribution from the Program for Energy Research and Development (PERD). The methodology is similar to that of a completed pilot project which studied the effect of renovating the homes for indoor air quality on the asthmatic condition of the occupants. This project will look at 20 case studies of moldy houses selected from different parts of the country and renovated by their owners. Remediation of the houses will incorporate measures to improve their energy efficiency. The output will be a research report that will be of interest to builders and renovators, the general public, the asthmatic population, researchers and physicians. The study should be complete by late 2003.

**CMHC Project Officer :** Virginia Salares

**CIDN :** 2157 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## INDOOR ENVIRONMENT

### RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY

CMHC is participating in an Industrial Research Chair in Health and Indoor Air Quality at Carleton University. The principal funding for this Chair is being provided by the Natural Sciences and Engineering Research Council (NSERC), Paracel Laboratories, Morrison Hershfield Ltd., Health Canada, Kingston General Hospital, Carleton University and CMHC. The Chair, in collaboration with its partners, will develop more rapid and cost effective methods for measuring the types and amount of mold in buildings and exposures of the occupants, construct a database of cultures of molds found in moisture troubled buildings, prepare purified extracts of the molds for allergy diagnostic tests and undertake studies of the effects of these molds on lung cells. The output from this Chair would have far-reaching benefits for the general population in the clinical diagnosis of mold allergy and the mitigation of mold contaminated buildings. A five year research program of the Chair is underway.

**CMHC Project Officer :** Virginia Salares

**CIDN :** 2269 0600

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## MANUFACTURED HOUSING

### FEASIBILITY OF UTILIZING A PORTABLE HOUSING PLANT FOR SINGLE FAMILY DETACHED CONSTRUCTION

This External Research project is studying the economic feasibility of using an automated, mobile plant to produce houses that are 90-95% complete when they leave the plant. The plant would be erected in the subdivision where the houses are to be built (with basement foundations pre-installed), and once the construction program is complete, the plant would be dismantled and shipped to the next locale. A draft final report has been received (summer 2002), and the final report is expected in the fourth quarter of 2002.

**CMHC Project Officer :** Chris Ives

**CIDN :** 2305 0200004

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### MANUFACTURED HOME DESIGN AND LAND LEASE COMMUNITY PLANNING

The purpose of this project is to explore various innovations in land use, infrastructure and unit design in manufactured home land lease communities across Canada. The intention is to demonstrate that not only can land lease communities be leaders in infrastructure innovation as well as providers of high quality affordable housing, but that in any community when these issues are explored simultaneously, that savings from one area can offset extra costs in another. The first of several demonstrations which will make up this project will undertake and complete the design of a Tee or L shaped 'foldable' manufactured home with improved heat storage and thermal envelope and its related site planning, as well as initial planning and infrastructure investigations for future phases of a land lease community in Nova Scotia. Other projects will investigate two storey designs and the use of containerized infrastructure modules.

**CMHC Project Officer :** Doug Pollard

**CIDN :** 2444 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## MANUFACTURED HOUSING

### MANUFACTURED HOUSING CONSULTANTS' TRAINING PROGRAM - PHASE II

This was a partnership project between the Canadian Manufactured Housing Institute (CMHI), the Provincial Manufactured Housing Associations of B.C., Alberta and Saskatchewan, Ontario and Atlantic Canada, and CMHC. The purpose of this project was to build on and improve the two day Manufactured Housing Consultants' Training Program and to ready it for ongoing delivery at the provincial level. The training program, which was developed under Phase I, covers a broad overview of the many aspects of the manufactured housing sales function. Topics include product and process knowledge, such as factory construction, zoning regulations, siting options, and transportation and installation procedures. Under Phase II, the participant's manual and the trainer's material were revised to incorporate improvements resulting from the pilot program, and new additional information such as: information for modular retailers, participants workbook, and marketing and promotional materials. These changes were necessary to ensure a high level of quality, effectiveness and consistency of the course delivery by the various provincial industry associations. This work has been completed and a number of courses have been offered with outstanding success. The program is being delivered through a partnership arrangement with provincial associations/organizations and is open to all representatives of the manufactured housing industry in Canada.

**STATUS :** Completed

**AVAILABILITY :** Seminar/training is available

## MOISTURE AND MOLD

### CLEANING UP YOUR HOUSE AFTER A FLOOD AND CLEAN-UP PROCEDURES FOR MOLD IN HOUSES

Two CMHC publications, "Cleaning Up Your House After a Flood" and "Clean-up Procedures for Mold in Houses", are undergoing revision. These documents have been widely used since 1993. The revision will incorporate the most up-to-date information on dealing with mold and provide steps for homeowners to follow in assessing and fixing the problem.

**CMHC Project Officer :** Virginia Salares

**CIDN :** 2447 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### DEFINING PERFORMANCE OF WATER RESISTIVE BARRIERS

Water Resistive Barriers (WRB), also known as sheathing membranes, fulfill many critical functions in the building envelope, but the means to evaluate their field performance has not been adequately developed. This is a pilot project that aims to define the key elements affecting performance of WRB in stucco systems with a view to pursuing the following objectives: 1. Develop adequate experimental characterization of likely WRB field performance. 2. Define WRB characteristics needed for input into advanced Heat Air and Moisture (HAM) models. 3. Examine probable long-term performance of WRB and in particular, study the effect of chemical leaching from stucco products and wood based materials. 4. Compare the results of wetting and drying predicted by advanced HAM models with experimental results.

It is expected that helping manufacturers and users of breather-type moisture barriers define the performance of such materials in both conventional and rainscreen walls will lead to better differentiation between applications of different WRB products as well as in development of new products.



## MOISTURE AND MOLD

The External Moisture Control (EMC) Consortia, comprising Canada Mortgage and Housing Corporation, the Homeowner Protection Office, E.I. Dupont de Nemours Inc., Fortifiber Corporation, and HAL Industries are funding this project. The study is being performed at Concordia University. Completion of the project is expected by spring 2003.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2490 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### GUIDELINES FOR MOISTURE MANAGEMENT IN EXTERIOR WALL SYSTEMS

CMHC is providing financial and technical support to NRC/IRC to develop guidelines for moisture management strategies for exterior wall systems. The guidelines will address user requirements for long-term performance and durability of wall systems for the wide range of climate zones across North America.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2199 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### GUIDELINES FOR ON-SITE MEASUREMENT OF MOISTURE IN WOOD BUILDING MATERIALS

Builders, inspectors and engineers undertaking moisture measurements on site in many instances do not possess the necessary background for using or interpreting moisture meter readings from wood and wood-based products. Because judgement is also needed in their interpretation, this document has been prepared to provide both detailed instructions and background information to assist persons involved in these endeavours. The objective of this report is to assist those not fully informed in wood moisture measurement technology and to provide general guidance with respect to measuring wood moisture content in field conditions. The document outlines the types of available moisture meters, a process of how to take moisture readings, where to take moisture readings and how the moisture readings are corrected for temperature and wood species. In addition, the document will provide a general discussion about steps builders and designers can take to minimize construction complications due to moisture.

*Prepared by Forintek Canada Corp. Sponsored by Canada Mortgage and Housing Corporation and Canadian Wood Council. Ottawa: CMHC, c2001. 1 CD-ROM*

**STATUS :** Completed CD-ROM

**AVAILABILITY :** Canadian Housing Information Centre

### IMPROVEMENTS TO THE MOISTURE PERFORMANCE OF PRESERVED WOOD FOUNDATIONS

Previous work by Forintek, the wood industry research agency, has established that the bottom plate of preserved wood foundation walls is very often over 20% moisture content. The wood preservatives generally prevent this relatively high moisture content from causing any degradation in structural strength. However, it is possible that the wet plate will transfer moisture to the insulated cavity above. This may lead to the development of mold in the wall cavity. The objective of this research project was to retrofit a mold troubled Ottawa area preserved wood foundation to validate a practice for reducing a high moisture level and mold within the PWF cavity. The demonstration house has been modified by using fans to ventilate the lower part of the wall cavities. Wood moisture levels were monitored through 2001. The remediation was successful at

## MOISTURE AND MOLD

preventing noticeable levels of mold in the cavities or the house air during the monitoring period. Data analysis continues to quantify the actual reductions in wood moisture levels.

**CMHC Project Officer :** Don Fugler

**CIDN :** 2419 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL ASSEMBLIES - COQUITLAM, BC

Wood framed buildings in the Vancouver area have experienced excessive moisture damage to the sheathing boards and wood framing over the past decade. This applied research project, funded by Canada Mortgage and Housing Corporation in partnership with Polygon Homes Ltd., involves the development of a building envelope diagnostic tool, specifically, an in-situ monitoring method to diagnose causes of moisture problems in low-rise wood-framed construction. This method is important to residential building owners as it can be used to develop cost effective remedial repair recommendations and to promote better design and construction guidelines for new buildings. This project's objective is to monitor the performance of the exterior wall assemblies of two, 46 unit four-storey buildings in Coquitlam, BC. Monitoring will be carried out for one full year, capturing the wall response to the range of climate loading conditions. Exterior walls, including interior living spaces as well as interstitial wall areas, will be monitored for temperature, relative humidity, wood moisture content and air pressure differentials. A weather station, mounted on the roof of one building will capture the local weather conditions: air temperature and relative humidity, wind speed and direction and rainfall. Monitoring of the buildings began in January 2001. Data collection will continue until the spring 2002. Project completion is expected before December 2002.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2254 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL SYSTEMS - VANCOUVER, BC

Wood framed buildings in the lower mainland of British Columbia have experienced excessive moisture damage to both sheathings and framing materials. In recent years, with the adoption of Best Practice principles throughout the construction industry (by builders and developers, design professionals and various construction trades) coupled with regulatory amendments to the City of Vancouver building by-laws, a new generation of exterior wall assemblies incorporating a 'rainscreen' moisture management strategy has been constructed. How effective were these walls at managing the exterior moisture loads? The objective of this applied research project, funded by Canada Mortgage and Housing Corporation, is to monitor, assess and document the performance of a residential low-rise four storey, wood-framed building which incorporates rainscreen design technology, and to analyze data to determine the effectiveness of wood frame rainscreen wall assemblies at managing exterior moisture loads. Monitoring of interior, exterior and interstitial wall areas will include temperature, relative humidity, wood moisture content and air pressure differentials. A weather station mounted on the roof of the building will capture the local weather conditions: air temperature and relative humidity, wind speed and direction and rainfall. Monitoring will be carried out for one full year, capturing the wall response to the range of climate loading conditions. Project completion is expected in the spring of 2003.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2254 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## MOISTURE AND MOLD

### MODIFY AND UPGRADE WALLDRY COMPUTER PROGRAM

This project's objective is to modify and upgrade WALLDRY, a computer program developed by CMHC, which models the flows of moisture, heat and air through wall assemblies. Project completion is expected by the fall of 2003.

**CMHC Project Officer :** *Silvio Plescia*

**CIDN :** 2505 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### MOLD CLEANUP PROCEDURES: CONTRACTORS' GUIDE

A draft document for professionals on Mold Cleanup Procedures is under development by CMHC. The focus of the document is on information required by contractors involved in renovation and clean-up of mold contaminated houses. As a result of rapidly evolving knowledge in this field, the current draft of the document and its mold cleanup procedures are now being revised to incorporate more current and substantive information from authoritative sources. This document will address mold cleanup in general and will include information on the precautionary measures required to protect workers and occupants, and present best practices for mold remediation. A significant change in approach since preparation of the original draft is the expert consensus that mold remediation should be approached from the perspective of the size of visible mold area rather than the type or toxicity of the molds present.

**CMHC Project Officer :** *Virginia R Salares*

**CIDN :** 2380 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## NORTHERN HOUSING

### COMPARISON OF NORTHERN HOUSING COSTS

This database includes every community in Labrador, Nunavik, Nunavut, NWT and Yukon. Using the Department of Public Works and Government Services National Master Specifications, this database outlines all components associated with the production of a northern home - from soft to hard, at both the house level and community level to determine which elements, in which locations are inordinately skewing costs. Through use of index communities (the shipping points of Edmonton, Winnipeg and Montreal), it permits comparison of housing costs from North to North, and from North to South. Launched in 2002, it will be annually updated. The operationalized database will permit future tracking and analysis such as life cycle performance costs; where use of local labour, indigenous materials and value-added processing of raw, local materials can be developed or expanded to reduce housing costs; and where capacity building may be of benefit. In 2002, much empirical data was not available, and statistically valid measures were used to calculate incomplete data. Over the next several years, through annual data collection, enough "hard" data will be entered to allow users to work from entirely real data. The Excel spreadsheets can be downloaded and the user can manipulate the data for their own uses.

**CMHC Project Officer :** *Aleta Fowler*

**CIDN :** 2370 0200003

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



# NORTHERN HOUSING

## CONTINUATION OF NORTHERN VENTILATION STUDY

This project is a continuation of related CMHC research into ventilation needs and performance in northern homes. Adequate, appropriate and affordable means of ventilation and verification of manufacturer's claims need to be assessed, using an established, consistent methodology. Practical and effective options for ventilation are needed to alleviate potential health problems and building damage. The research report will be completed and published in 2002 or early 2003.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2420 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HEALTHY HOUSING IN THE NORTH: TOWARDS A NORTHERN HEALTHY HOUSE DEMONSTRATION PROJECT

This study is a review of the principles and technical information that can influence the realization of healthy and more sustainable housing in the North. The objective of this study is to begin addressing and enhancing the ecological sustainability, social appropriateness, and total (real) economic aspects of northern housing. The approach is to develop the concept of the Healthy House in a northern context.

People who design and construct housing in the North need to become more conscious of their impact on the environment, social structures and energy use. High environmental and dollar costs of fossil fuel energy in the North demand reconsideration of conventional building design, materials and technical systems. The need for repairing and reinforcing the social fabric calls for appropriate environmental and cultural design to create healthy and locally supported, self-sufficient northern communities. This study reviews and examines influences, aspirations, limitations and potential technical options for increasing sustainability in northern housing.

The study is divided into two parts. Part One is an overview of the northern context, ecological sustainability, social appropriateness, and total (real) economic aspects of northern housing. Part Two is a review of technical options and information resources.

The intent of this study is to encourage the inclusion of environmentally responsible Healthy House concepts, systems and materials in the design, construction, operation, and final disposal of housing. The study is intended for the use of decision-makers who can advance this goal and may include: homebuilders and buyers; community planners, architects, and engineers; regulators and administrators; and policy makers. Northern training institutions could also use the study to supply people with the knowledge and skills to create northern healthy housing solutions.

Ultimately, this study and its guidelines are intended to contribute to northern housing that is more ecologically sustainable and locally and socially appropriate during construction, in operation and at the end of service.

*Written by Bob Bromley, Stephen Fancott, Bill Fandrick, Gino Pin. Additional writing by Donna Diakun. CMHC Project Manager: Aleta Fowler. Project Manager for Arctic Energy Alliance: Rob Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2002. iii, 76 pages*

NOTE: No. 02-126 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## NORTH WEB-SITE

The purpose of this web site is to present relevant Cold Climate technical information such as factsheets of research reports, databases and the Frostline newsletter. It also includes discussion groups to provide a means of ongoing and current communication including a bulletin board for up-coming events and links to other pertinent web-sites. The project partners are CMHC, Alaska Housing Finance Corporation (the host and sponsoring agency), NRCan (with their own portal), University of Alaska, Yukon Housing Corporation, NWT Housing Corporation and others. About to be launched, the site can be visited at <http://www.NoRTH-RTHN.org>.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2369 020001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet on the web

## NORTHERN HEALTHY MIXED-USE BUILDING DEMONSTRATION

This Yellowknife Demonstration is built upon a long line of research and is the necessary step in illustrating Healthy House principles and practices. This Demonstration will allow interested parties to view the performance and use of Healthy House components, permit informed choices for application in the North, nationally and internationally, and encourage more widespread adoption of Healthy House and better housing and community models. The demonstration will have a documented process for creation of a mixed-use, multistorey building which meets Healthy Housing objectives and resolves issues of higher upfront costs; site selection and land acquisition in the North; land ownership issues for a unique building; building tenure; Northern financing; Northern regulatory requirements; utility provision; and other pre-development considerations. The Demonstration will include an educational component and will be open to the public upon completion in 2003.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2471 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## NORTHERN LANDSCAPING: A GUIDE TO RESTORING THE PLANTS AND SOIL IN NORTHERN COMMUNITIES

This guide looks at ways disturbed northern soils, which are so common, can be made viable for plant growth - and subsequently, determines means of inducing plant growth in these disturbed areas. The guide is intended to help people in northern communities establish low-maintenance, "natural landscaping" appropriate to their region. The information will be useful to anyone involved in a community revegetation project including elected officials, contractors, schools and clubs, and other interest groups. It is not a guide to restoring contaminated sites, industrial sites, or for large ecological restoration projects. It is suitable for smaller-scale planting projects within communities. The emphasis is terrestrial (dryland) areas, though wetland (not fully aquatic) areas are also considered.

Natural landscaping involves the planting of a group of usually native species to meet some specific, aesthetic, management or design goals. Potential project sites are often already semi-natural, such as road embankments, stream edges, vacant lots or other community lands where the plants and soil were disturbed. Areas around homes and other buildings also have potential for natural landscaping. Planting new semi-natural areas which resemble the original ecosystems can beautify the community and produce other benefits, including:

- creation of habitat for wildlife such as birds and squirrels;
- reducing blowing dust;
- protecting soils from erosion;
- providing meaningful ways to educate about the natural environment;

## NORTHERN HOUSING

- fostering environmental awareness in a direct, hands-on, way;
- building a sense of community by pursuing and achieving common goals.

Techniques described in this guidebook will help achieve these kinds of goals with little input of energy and resources such as water, fertilizers, and fuel, etc. once the revegetated area is established. A virtually self-supporting system is the goal.

*Prepared by Avens Associates Ltd. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Aleta Fowler. Ottawa: CMHC, 2002. 87 pages*

NOTE: No. 02-128 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

### UPDATE THE NORTHERN UTILITY COSTS REPORT

This is a key baseline study. First done in 1996 by the NWT Housing Corporation, this updated work now includes all power, heat, water and sewage costs for each community in Labrador, Nunavik, Nunavut, NWT and Yukon. It includes the source of each utility (i.e. diesel generator versus hydro) and complete information on subsidized residential rates, commercial rates and full economic costs of each utility. This database is designed to work in conjunction with the Comparison of Northern Housing Costs database (to evaluate whole home costs) and the Alternative Home Energy Sources for the North database. By using the three databases together, the optimal residential and community-level service can be determined on a community by community, and residence by residence basis.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** 2467 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### USE OF ON-SITE WASTE WATER RECYCLING MICROSYSTEMS FOR SPRINKLER SUPPLY

The high cost of northern housing, and housing insurance, may justify the installation of fixed automatic fire suppression systems. Conventional sprinkler systems require more water than is presently available in buildings and would entail substantial redesign. With microsystem technology, excess water of "swimming pool" quality is constantly produced which must be periodically pumped away, or disposed of on-site. This excess water could be easily stored for sprinkler use. In the North, loss of life due to fire is 10 times higher than in the South. Building loss, when a fire occurs, is nearly 100%. Most communities rely upon volunteer fire departments and upon reservoirs which have limited capacity. Alternatives are needed and this study will determine the means and feasibility of taking this next step. Research will be incorporated from CMHC's microsystem technology, National Research Council's Compressed-Air-Foam technology, Architectural and Community Planning's EcoNomad, the Canadian Residential Sprinkler System Association material, and the HydraTank technology, as well as conventional residential sprinkler systems studied in previous work by CMHC and the National Fire Laboratory. By determining a reliable supply of water for any of the sprinkler technologies, significant gains can be made in protecting Northern lives and buildings from fire. This feasibility work is expected in 2003.

**CMHC Project Officer :** Aleta Fowler

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



## PROPERTY MANAGEMENT

### CONTRACT MANAGEMENT COURSE FOR RESIDENTIAL PROPERTY MANAGERS AND BUILDING OWNERS

This project will develop course content to provide an introduction to construction/contract management processes for residential property managers, building owners and anyone involved in the administration of multi-unit residential buildings. The course material will be as applicable to the management of major service contracts as it is to major construction works including repair, replacement and/or rehabilitation projects. Topics covered in this course include the different types of construction or service contracts, a discussion of the construction process, administering the tendering process, evaluating the tendered bids, contractor/consultant selection, bonding and insurance requirements, the building owners responsibilities and those of the contractor/consultant. This project should be completed by late in 2003.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

### ECO-ASSESSMENT TOOL FOR PROPERTY MANAGERS OF MULTIPLE UNIT RESIDENTIAL BUILDINGS (MURBS)

The purpose of this project is to develop the MURB Tool with the objective of obtaining a self-assessment procedure which is easily accessible and which is relevant to Canadian property managers.

**STATUS :** Completed

**AVAILABILITY :** Product is available on the web

### REVISIONS TO THE OPERATING GUIDES FOR OWNERS, MANAGERS AND CUSTODIAL STAFF

This project will revise, update, and make print-ready the publications presently known as the CMHC Multi-Residential Manager and Owner Maintenance Manuals. The publications provide best practices for property owners and managers and provide operational instructions for on-site staff.

**CMHC Project Officer :** Duncan Hill

**CIDN :** 2501 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### TECHNICAL AUDIT COURSE FOR PROPERTY MANAGERS

This project, funded by Canada Mortgage and Housing Corporation in partnership with the Real Estate Institute of Canada, aims to develop a course for property managers on the technical audit of high-rise residential buildings. Using a building as a system approach, this course will provide property managers and building owners with a perspective of the interaction of all building systems and components. Such training is not available to residential property managers in Canada. Technical audits, an organized review of building systems, are an effective way to assess the condition of a building, to understand how the building is performing and to provide a sound basis for making maintenance, repair and upgrade decisions. The course provides the property manager with insights into the technical audit process and highlights the requirements for undertaking technical audits of residential buildings including the scope of the work and the consultant qualifications. The course also introduces the fundamental principles of building science to

## PROPERTY MANAGEMENT

encourage holistic solutions to building problems. The course documents are expected to be completed by end of 2002.

**CMHC Project Officer :** Silvio Plescia

**CIDN :** 2297 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RENOVATION AND INSPECTION

### CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS NATIONAL INITIATIVE - PHASE II

With the successful completion of the first phase of this multiphase project, which was to develop national occupational standards for the private home inspection and municipal building code inspection sectors, the Canadian Home Inspectors and Building Code Officials are now preparing for Phase II which is to use the occupational standards to:

- conduct a gap analysis to identify any curriculum and training needs;
- develop curriculum and training programs to meet their needs;
- identify a certification and accreditation model that could be adopted for their industry sectors;
- establish an accreditation program for institutions delivering training programs.

This project is supported by the private and public inspection industry sectors, Human Resources Development Canada (HRDC) and CMHC. A proposal has been developed and submitted to HRDC requesting their continued assistance with Phase II. It is anticipated that Phase II will commence in November, 2002 and will be completed by March, 2004. Following the completion of Phase II, the two sectors should be in a position to implement the certification and accreditation programs for their respective industry sectors under Phase III. The private home inspection industry has recently established a national association to represent their industry, i.e. Canadian Association of Home and Property Inspectors (CAHPI).

**CMHC Project Officer :** Darrel Smith

**CIDN :** 1962 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** There will be no product for this project

### HIRING A HOME INSPECTOR. ABOUT YOUR HOUSE; CE35

This fact sheet offers helpful guidance to consumers on questions to ask and what to look for when in the market for a qualified home inspector. The fact sheet was done in consultation with the private home inspection industry through members of the Canadian Association of Home and Property Inspectors (CAHPI) as well as through home and property inspector members of the Canadian Home Inspectors and Building Officials Committee. The fact sheet includes information on the following:

- current situation (who is out there and what regulations exist);
- CAHPI's national initiative (purpose and objectives);
- services provided by home inspectors and why they are needed;
- questions to ask and what to look for when hiring a home inspector; and
- what to expect (time involvement, cost, written report).

Ottawa: Canada Mortgage and Housing Corporation, 2002, c2001. 4 pages

Note: Aussi disponible en français sous le titre : Le choix d'un inspecteur en bâtiment

**STATUS :** Completed fact sheet. Order number: 62839

**AVAILABILITY :** CMHC Information Products and on the CMHC web site

## HOMEOWNER'S INSPECTION CHECKLIST

The "Homeowner's Inspection Checklist" is aimed to help consumers conduct an inspection of their home to identify problems or potential problems. It will help identify symptoms, cause and cures for common problems in homes. This book is not a comprehensive inspection manual, nor will it replace an examination by a qualified home inspector. It will help determine if a thorough inspection is needed, if you can repair a problem yourself, or if you should consult a professional tradesperson or contractor. The "Homeowner's Inspection Checklist" will also help you assess how a home measures up according to the principles of Healthy Housing occupant health, energy efficiency, conservation of resources, environmental impact and affordability. A maintenance calendar at the end of this book is a weekly guide to routine tasks.

*Prepared by Ted Kesik. CMHC Project Officer: Darrel R. Smith. Ottawa: Canada Mortgage and Housing Corporation, 2002. 107 pages*

Order number: 62114 \*\*Price: \$19.95 + GST and handling charges

NOTE: Aussi disponible en français sous le titre : Guide d'inspection du propriétaire-occupant

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

## MANDATORY HOME INSPECTIONS ON RESALE HOMES IN ONTARIO

A CMHC External Research Program (ERP) grant was awarded to research the issue of mandatory home inspections for resale homes in Ontario with a number of housing industry interest groups. The research was to determine why this requirement was never imposed in the past, the pros and cons of enacting such a requirement in the future, and how could such a requirement be enacted and by whom. The study also investigated if the existing home inspection industry could handle the increased capacity of such a requirement. The research is completed and the final report is anticipated to be available by late 2002.

**CMHC Project Officer :** Darrel Smith

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2437 0200015

**STATUS :** Ongoing

## MERGE THE EXISTING NATIONAL AND PROVINCIAL ASSOCIATIONS INTO ONE NEW NATIONAL ENTITY TO REPRESENT THE PRIVATE HOME AND PROPERTY INSPECTION INDUSTRY ACROSS THE COUNTRY

The objective of this project was to assist the private home and property inspection industry as it merges the existing national and provincial associations into one new national entity, i.e. the Canadian Association of Home and Property Inspectors (CAHPI). CAHPI will represent the private home and property inspection industry across the country. On behalf of CAHPI and the Canadian Association of Home Inspectors (CAHI), a consultant facilitated a planning process and developed a strategy outlining the necessary steps for the orderly progress of this merger into CAHPI. This project is complete and industry is implementing steps for merging their associations.

**STATUS :** Completed

**AVAILABILITY :** There will be no product for this project



## RENOVATION AND INSPECTION

### RECYCLE: LIFECYCLE - HOW TO RENOVATE A HOME FOR CHANGE

This project's purpose objective is to provide develop a set of design strategies for adaptable renovations involving a variety of common, detached housing types. The goal objective of these strategies is will be to inform homeowners, or prospective homeowners, about how they could, through alterations or additions to their homes, through alterations and additions of ways to achieve the greatest flexibility through alterations and additions to their houses meet their changing needs.

**CMHC Project Officer :** Thomas Parker

**CIDN :** 2437 0200014

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Research highlight is not yet available

### RENOVATING DISTINCTIVE HOMES: ONE-STOREY HOUSES OF THE '60S AND '70S

This publication will lead the homeowner through an energy efficient, healthy renovation. The document highlights floor plan changes and repairs that are particular to sixties and seventies bungalows, as well as including general guidance on renovation planning and how to hire a contractor. There are also details in the publication on how to make these forty year old houses more energy efficient, healthier for occupants, and suitable for people with limited mobility. The advice considers occupant lifestyle and needs, structural and maintenance requirements, "Healthy Housing" improvements (including environmental and energy-efficiency), and the impact on home equity and resale value.

*Ottawa: Canada Mortgage and Housing Corporation, 2002. 88 pages*

Order number: 62805 \*\*Price: \$14.95 + GST and handling charges

Note : Aussi disponible en français sous le titre : La maison réinventée: rénovation des bungalows des années 60 et 70

**STATUS :** New Completed Report

**AVAILABILITY :** CMHC Information Products

### REVISION OF HOME CARE: A GUIDE TO REPAIR AND MAINTENANCE

The purpose of this project was to do a major update and revision of Home Care: A Guide to Repair and Maintenance. As part of the revision, the publication titled New Life for an Old House, which is no longer in print, was also reviewed and where appropriate the information on home repair was incorporated into Home Care to produce one comprehensive home maintenance and repair guide. The revised publication includes information from recent research and new topics on home repair (not renovation), home maintenance, and Healthy Housing as part of the update. The content emphasizes Canadian issues whenever possible to differentiate it from similar American products. A steering committee comprised of First Nations members, a home inspector and CMHC staff was established to help guide the consultant and review the material. The new publication is anticipated to be available by early 2003.

**CMHC Project Officer :** Darrel Smith

**CIDN :** 2516 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

### TRANSFORMING YOUR PRACTICE: INTEGRATED DESIGN CHARRETTE FOR SUSTAINABLE BUILDINGS: TORONTO CHARRETTE RESULTS

This charrette took place in Toronto, at the City of Toronto's Metro Hall, November 7th and 8th, 2001. The objective of the Toronto Charrette event was to use the integrated design process (IDP) to push the boundaries of building performance towards more sustainable practices. The sessions were intended to take a varied complement of professionals through an integrated design process in the context of a new project, so that they would "learn by doing" and be able to use IDP within their own practice.

Four partners supported Canada Mortgage and Housing Corporation in this event:

- Enbridge Consumers Gas,
- City of Toronto's Better Buildings Partnership,
- Natural Resources Canada's Office of Energy Efficiency, and the
- Canadian Energy Efficiency Alliance.

The goals of the partners were to:

- Establish a forum where a multi-disciplinary group of design professionals could work together on a sustainable design project,
- Gain insights into sustainable building practices, and
- Learn how to advance building performance, starting from design conception to understanding of operations issues, building on each others' unique perspectives and expertise.

This document discusses the integrated design process and reports on the results of the charrette.

*Prepared by IndEco Strategic Consulting Inc. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Sandra Marshall. Toronto: IndEco Strategic Consulting Inc., 2002. 96 pages*

**STATUS :** Completed Report

**AVAILABILITY :** On a loan basis from: Canadian Housing Information Centre

## WATER CONSERVATION, REUSE & MANAGEMENT

### BUYING A TOILET. ABOUT YOUR HOUSE; CE 39

This 4 page fact sheet is aimed at consumers and provides information and advice on buying a toilet. It covers where toilets can be purchased, the average cost, outlines the differences between 6 litre and 13 litre toilets, touches on legislation, warranties, and rebates, and discusses important factors to consider in the purchase of tanks, flappers, fill valves, and toilet bowls. The fact sheet advocates the use of 6 litre toilet models to help lower water bills, reduce strains on water supply and wastewater collection infrastructure, and improve the environment.

*Ottawa: Canada Mortgage and Housing Corporation, 2002. 4 pages*

**NOTE :** Aussi disponible en français sous le titre : L'Achat de toilettes

**STATUS :** New Completed Fact Sheet. Order no. 62935

**AVAILABILITY :** CMHC Information Products and available on CMHC's web site

# WATER CONSERVATION, REUSE & MANAGEMENT

## CASE STUDIES OF WATER CONSERVATION INITIATIVES IN MULTIS

CMHC, in partnership with City of Toronto Better Buildings Partnership, will document case studies of water conservation retrofits for multi unit residential buildings. The building profile, water conservation measures, costs and resulting water and energy savings will be described. The studies will serve as examples to encourage water use efficiency in other building and will appear on CMHC's website.

**CMHC Project Officer :** Catherine Soroczan

**CIDN :** 2239 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## DUAL FLUSH TOILET PILOT PROJECT

This project is now complete - results indicate that dual flush toilets perform well in comparison to 6L and 13L toilets based on water consumption rates, saving an average of approximately 26% more water than single flush 6L toilets when used in replacement programs. Despite some complaints about bowl streaking, all survey respondents indicated that they liked the dual flush option. A further study has been initiated based on the findings of CMHC's work. Durham region is currently evaluating 10 newly installed dual flush toilets in a seniors' complex the results of this work will be available in 2003.

**CMHC Project Officer :** Catherine Soroczan

**CIDN :** 2336 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ECONOMIC FEASIBILITY STUDY OF WATER REUSE AND TREATMENT TECHNOLOGIES

The purpose of this project is to undertake and complete an economic feasibility study of water reuse and treatment technologies. The contractor will assess ten case studies of on-site water reuse applications. The final draft has been received and the case studies will be uploaded to the CMHC water website on a monthly basis. Further attention is being paid to the financial aspects of water reuse and full costing.

**STATUS :** Completed

**AVAILABILITY :** Product is available on the web

## MAXIMUM DAY WATERING DEMAND PHASE II - ASSESSMENT OF WATER CONSERVATION STRATEGIES

This project's objective is to determine the impact of the Household Guide to Water Efficiency on indoor and outdoor water consumption. Specifically it will seek to address the questions: Is the impact on consumer behaviour maintained in the long term, what effect does the Guide have on outdoor water use during the summer months, and what extra impact does a complementary social marketing campaign have on consumer behaviour? This work is part of the second phase of the Max Day project initiated in 2000, which saw a reduction in consumption rates based on conservation method used.

Although not conclusive, the data analysis indicates that demands were reduced in the two study areas after the related programs were implemented. The data related to the Survey Area was not conclusive as there was almost no irrigation subsequent to the survey being performed. It appears that the distribution of the Household Guide to Water Efficiency was responsible for a savings of



## WATER CONSERVATION, REUSE & MANAGEMENT

between 34-54 litres per household per day (combined indoor and outdoor use). The analysis also shows that the "Drop-Off" and "Phone" methods of delivery had cost-benefit ratios of .39 and .37 respectively i.e. both methods are more than twice as cost-effective as infrastructure expansion. The widely fluctuating irrigation demands during the summer of 2001 make it difficult to accurately assess the effectiveness of the three methods of distributing the Household Guide to Water Efficiency. The analysis was further complicated by the implementation of a watering ban during the monitoring period. A follow-up analysis was undertaken during the summer of 2002. The results of this will be available by Winter 2002.

**CMHC Project Officer :** Catherine Soroczan

**CIDN :** 2341 0200003

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### PERFORMANCE ASSESSMENT OF LOW FLOW TOILETS

This project's objective is to set up and conduct a monitoring program to verify the flush volumes of 6-litre Ultra Low Flow (ULF) toilets installed in single-family homes as part of Durham's retrofit program. Results indicate that depending on the brand of toilet installed there is a mixed reaction to ultra low flow technology.

**STATUS :** Completed    **AVAILABILITY :** Product is available on the web

### REMOTE MONITORING AND CONTROL OF ON-SITE WASTEWATER TREATMENT, RECYCLING AND RE-USE SYSTEMS

This External Research Project addresses remote monitoring and control of systems for on-site wastewater treatment, recycling, and re-use. Effective, reliable, and long-term performance of even the simplest of these systems requires at least periodic monitoring, and the most sophisticated systems require continuous monitoring and control capability.

There are two objectives to this research:

1. To produce a resource document for multi-stakeholders: planners, managers, regulators etc. who have interests or responsibilities related to systems for on-site wastewater treatment, recycling, or reuse; and
2. To produce a supplementary document that will propose ways in which the contents of that document can be communicated most effectively to those users.

An interim report has been received and is being reviewed.

**CMHC Project Officer :** Catherine Soroczan

**CIDN :** 2437 0200020

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### SAFE EFFLUENT WASTEWATER RECOVERY SYSTEM (SEWRS)

This project is focusing on greywater systems for single family homes. Although the performance data collection will be for homes in southern Ontario and thus be not directly to the more northern parts of Canada, the final report will address changes required in these systems for application in the colder climate of the North.

**CMHC Project Officer :** Catherine Soroczan

**CIDN :** 2437 0200022

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### WATER AND SEWAGE HANDLING SYSTEMS IN NORTHERN AND REMOTE COMMUNITIES

This project's objective is to collect and publish in fact sheet format the following information on water and sewage handling systems in northern and remote communities: description of the technology and construction, engineering application and performance, capital and operating costs and any available user case studies. It is proposed that this project include the demonstration and monitoring of 6-10 "EcoSeptic" micro-sewage systems in a northern Ontario or Manitoba community with severe pollution problems that is willing to consider less costly alternatives to conventional sewage infrastructure. A suitable test site/community for the demonstration of "EcoSeptic" micro-sewage systems has not yet been secured. However another developer of an innovative micro-sewage system has secured five test installations in southern Ontario and Quebec. It is planned that these systems will be monitored for a period of at least eighteen months.

**CMHC Project Officer :** Chris Ives

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### WATER EFFICIENCY CASE STUDIES

The purpose of this project is to develop six case studies focusing on specific residential water efficiency initiatives that are being delivered by six cities across Canada. Final product will be available on the web site.

**CMHC Project Officer :** Sandra Baynes

**CIDN :** 2239 0200004

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet on the web

### WATER QUALITY MONITORING OF THE TORONTO HEALTHY HOUSE

The purpose of this project is to undertake the collection of water samples along various points from the Toronto Healthy House Water Reuse System and have them analyzed for a number of water quality parameters. Monitoring is underway and is scheduled for completion late 2002.

**CMHC Project Officer :** Catherine Soroczan, Sandra Baynes

**CIDN :** 2337 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## SOCIO ECONOMIC RESEARCH



## ABORIGINAL HOUSING

### ADAPTATION OF POTENTIAL HOUSING DEMAND MODEL TO ABORIGINAL COMMUNITIES - AN EXAMPLE

This study will build on the results of a feasibility study that looked at the application of CMHC's potential housing demand model in Aboriginal communities. It will take the recommended actions and apply them to a test case of the Nishnawbe Aski Nations (NAN), a grouping of 49 bands in Northern Ontario. Some specific tasks will be: to monitor the degree of difficulty that NAN administrators encounter in gathering accurate input data, to refine the assumptions on headship rates and household types that will be parameters for the model. Eight communities from NAN will be piloted in a first phase, and if successful, the other communities will follow as Phase 2.

**CMHC Project Officer :** Phil Deacon

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ALTERNATE ABORIGINAL TRAINING DELIVERY OPTIONS

Recent experience has shown the need to explore alternate approaches to the delivery of training to First Nations (FN) and other Aboriginal communities. A current study is looking at the feasibility for these communities to share training expertise and resources; and a number of promising approaches are being identified, which could supplement some current approaches.

This study will examine promising approaches to share training expertise and resources, how logistics could work, and the sort of pay backs that the trainer or "training community" could expect. It is hoped that the results will point to new directions which might provide for a more efficient use of available resources and support capacity development.

**CMHC Project Officer :** Marcelle Gareau

**CIDN :** 01PLO-8426

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### COMMUNICATIONS & INFORMATION TRANSFER STRATEGY FOR ABORIGINAL GROUPS

The goal of this project was to develop a communications and information transfer strategy that will help CMHC in its interactions with Aboriginal housing groups regarding capacity development, research and information transfer activities. To be effective, information has to reach the audience that matters and be in formats that have the maximum impact.

The study looked at the barriers to finding and using housing related information, what makes housing related information relevant, what are key influences, and how effective are the available communications vehicles and distribution channels, all in regard to Aboriginal audiences.

The project consisted of: an assessment of existing communication strategies and marketing research in the area of housing information and training; personal or telephone interviews with senior officials of key national and provincial stakeholder groups; group discussions with a broad range of the key client groups as defined in target audiences; and development of alternative communications and information transfer strategies for CMHC and assessment of their relative costs.

The target audience for this project is made up of: key decision makers in housing operations and policies, provincial organizations chosen to give regional coverage, major national organizations, and regional CMHC program officers.

## ABORIGINAL HOUSING

The geographic coverage is Canada wide. All types of Aboriginal community, on or off-reserve in rural, remote and urban communities are included.

*Prepared by Poirier Communications. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Philip Deacon . S. I.: Poirier Communications, 2000.*

2 volumes: vol. 1 Final Report (130 pages); vol. 2: Dialogue Circle Transcripts (85 pages)

**STATUS :** Completed Report

**AVAILABILITY :** On a loan basis from: Canadian Housing Information Centre

### EFFECTS OF URBAN ABORIGINAL RESIDENTIAL MOBILITY AND SERVICE PROVISION

This project's objective is to examine the effects of urban Aboriginal residential mobility upon the provision of public and private services provision, in areas such as (the) housing, education and health care (sectors), in the Census Metropolitan Areas of Regina, Saskatchewan and Winnipeg.

This project will examine the effects of Aboriginal urban mobility upon service provision in areas such as housing, education, and health care in both the private and public sectors. The project is aimed at examining the effects of Aboriginal urban mobility upon the provisions of services to Aboriginal people in Winnipeg and Regina.

**CMHC Project Officer :** Marcelle Gareau

**CIDN :** 2436 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### EXAMINING INUIT SPACE USE IN EURO-CANADIAN HOUSE FORMS

This project is intended as the initial phase of a long term investigation of Inuit spatial behaviour in Euro-Canadian type housing . The main objective is to find out whether this type of housing is meeting the needs and preferences of users.

**CMHC Project Officer :** Marcelle Gareau

**CIDN :** 2437 0200019

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### FIRST NATIONS HOUSING PROPERTY MANAGEMENT TRAINING COURSES AND RESOURCES

This project's objective is to undertake and complete the identification and assessment of First Nations housing property management training courses and resources and provide recommendations for a comprehensive curriculum and innovative approaches to delivery in remote communities.

**CMHC Project Officer :** James A Rockwood

**CIDN :** 2374 1500001

**Division :** Assisted Housing Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## ABORIGINAL HOUSING

### INVESTIGATING AND DOCUMENTING FIRST NATION TECH SERVICES INSTITUTES

The objective of this project is to undertake the profiling of two provincial First Nation technical services organizations for the purpose of documenting organizational success factors in a user-friendly framework.

**CMHC Project Officer :** Alain Croteau

**CIDN :** 2475 1500002

**Division :** Assisted Housing Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### MEASURING RESIDENTIAL MOBILITY OF URBAN ABORIGINAL PEOPLE

This pilot study provides information about how a survey methodology can be used to identify patterns of residential mobility among urban Aboriginal populations. The objectives of this pilot study were to design and test such a survey methodology, not to support statistically significant inferences for Aboriginal populations in urban centres. A questionnaire was developed and tested with a sample of 144 Aboriginal respondents living in two urban centres -- Toronto (73) and Winnipeg (71). The sample included respondents from First Nations (96), Métis (40), Inuit (4) and other Aboriginal groups (4). Fourteen Aboriginal organizations in the two selected cities identified respondents, the majority of whom were women, and participated in the survey administration. Information was gathered between November, 1999 and January, 2000 using in-person interviews, telephone interviews and self-administered questionnaires.

Substantive issues dealt with general topics such as residential migration and mobility, frequency and duration of homelessness, current and projected housing needs, empirical linkages and diversity (gender, income, employment, education) of the study population. Survey design issues dealt with Aboriginal consultations, representative pre-testing, literacy and survey administration methods. Respondents took an average of 35 minutes to complete the pre-test version of the questionnaire. The section on Moves (Migration and Mobility) provided the greatest recall challenge for respondents.

The pilot study demonstrated that details of past moves can be tracked, within limits. The survey tracked up to three moves within a five year time period based on respondent recall. Field team reports indicate this horizon may be the practical limit of accurate recall. Some data quality problems were associated with questions such as changes in household type and size. The pilot survey explored the reasons and motivations behind the moves of Aboriginal people living in urban areas -- what some experts characterize as "push" and "pull" factors. While very preliminary, the pilot survey results were broadly similar to the results of the 1991 Aboriginal Peoples Survey (APS) which showed that family, employment, housing and education are the major reasons for moving. The pilot survey also successfully identified reasons for moves, using questions or probes to identify different types of housing-related reasons for moves. Reasons differ for in-city (mobility) versus to-city (migration) moves. Housing was a bigger factor for in-city moves while work and education were more important for people moving across city boundaries.

The pilot survey explored in some detail housing-related reasons for moving such as affordability, better quality, and housing that better suits household needs. Cumulatively, these different housing-related factors were identified by almost two-thirds of respondents as underlying their most recent move. This is much higher than the percentage of respondents to the APS who identified housing as a factor in either migration or mobility.

*Prepared by Turtle Island Associates. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Philip Deacon. Ottawa: CMHC, 2002 printing. (Aboriginal Housing Series) 86 pages*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



## ABORIGINAL HOUSING

### ON-RESERVE COMPONENT OF THE RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP PHASE III)

The purpose of this project is to conduct an evaluation of the on-reserve component of the Residential Rehabilitation Assistance Program (RRAP) Phase III.

**CMHC Project Officer :** Patricia Streich

**CIDN :** 2785 0501003

**Division :** Audit and Program Evaluation Services

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### URBAN ABORIGINAL PERCEPTIONS OF ACCESS TO HOUSING

The objectives of this project are: 1) To obtain baseline data on the nature and extent of discrimination in housing that Aboriginal people experience - case studies focus on Winnipeg and Thompson, Manitoba. 2) To quantitatively and qualitatively examine the key variables associated with housing discrimination for Aboriginal people, including such factors as residential migration/mobility, social cohesion, and ethnic clustering. 3) To explore the effect that discrimination in housing for Aboriginal people has with regard to other victimization. This will be done by comparing the housing related factors to a more general survey of victimization (National Community Victimization Project) being carried out by Simon Fraser University with a SSHRC grant.

**CMHC Project Officer :** Phil Deacon

**CIDN :** 1990 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CHILDREN'S ENVIRONMENTS

### HOUSING FORM AND QUALITY IN RELATION TO CHILDREN'S MENTAL HEALTH

This External Research Project (ERP) will examine whether housing form and quality are related to the socio-emotional health of children. It will use standardized measures of housing quality and mental health, two major housing forms (single family and low-rise cluster), and will consider the role of various potentially moderating influences, including socioeconomic status and indoor population density to answer the basic question: "How, if at all, does housing form and quality affect the socio-emotional health of urban Canadian children."

**CMHC Project Officer :** Fanis Grammenos

**CIDN :** 2437 0200013

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## CONCEPT OF A QUALITY LOCATION AND THE CENTRAL DISTRICTS OF MONTRÉAL

The primary scope of the proposed research will be to develop an approach based on sustainable development and aimed at better evaluating the capacities of an urban area to enhance its living conditions. In so doing, we believe that the proposed approach will support any measures to establish more effective guidelines for the improvement of these capacities.

**CMHC Project Officer :** Paul Cardinal

**CIDN :** 2437 0200008

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## REQUALIFICATION OF SUBURBS AND REGULATORY FRAMEWORKS: CURRENT SITUATION AND EASING MEASURES

The objectives of this study are, first, to analyze the current regulatory frameworks that could support proposals for the requalification of Quebec suburbs and, second, to propose measures that could be introduced to make it easier for these districts to adapt to the social and physical changes that they are undergoing.

**CMHC Project Officer :** Philippe LeGoff

**CIDN :** 2437 0200018

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## WHY CITIES MATTER: POLICY RESEARCH PERSPECTIVES FOR CANADA

The objective of the research was to assess existing knowledge of the ways cities matter in an era of globalization, identify common themes from the literature and existing policy networks and propose future directions for policy research and action at the community as well as the regional and national levels.

Contrary to predictions of the "locationless" effects of virtual communications and the "death of distance", urban centres have become more - not less - important as places where people live, work and play. Yet, experience shows that cities can be both engines of national prosperity and locales where the risks of social exclusion and environmental degradation exist. Better understanding is required of the factors that will sustain vibrant Canadian cities and healthy communities in a global age. This project examined these issues in the literature, through existing policy and networks and through a roundtable.

The first part of the paper traces the complex economic, social and political transformations that have put Canadian cities back on the agenda of policy communities. Choices must be made about how our urban spaces will be managed, whether investments will be made in human resources and physical infrastructure of cities and what new fiscal tools and financing mechanisms will be available to municipalities. The second part of the paper provides historical perspective on these challenges and choices and shows that the present day is not the first time that such fundamental questions have surfaced about cities and their role in national life. The third part of the paper maps four distinctive frameworks for mobilizing and advancing strategies to regenerate Canadian cities. These are: economic cluster; social inclusion; community economic development; and environmental sustainability. The major political challenge is to bring these respective advocacy networks together into a workable policy mix. The fourth part of the paper addresses the possibilities for progress, connecting a vision of community-based regionalism to the fundamental questions of urban governance.

## CITY PLANNING AND HUMAN SETTLEMENTS

Given the increasingly important role of cities in shaping the country's economic, social and environmental well-being, Canada's new urban agenda must better align federal, provincial and municipal policies with the physical design and community planning of the country's diverse city-regions.

Prepared by Neil Bradford. Ottawa: Canadian Policy Research Networks, 2002. (CPRN Discussion Paper no. F/23.) viii, 86 pages

**STATUS :** New Completed Report

**AVAILABILITY :** Available on the web site of Canadian Policy Research Networks

## CONSUMER PROTECTION

### ISSUES PAPER ON LIABILITY IN HOUSE CONSTRUCTION

This project's objective is to produce a paper discussing the issue of liability in housing construction across Canada and identify who is and is not liable.

**CMHC Project Officer :** Mark Holzman

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 1920 0200001

**STATUS :** Ongoing

### RE-SALE OF LEAKY CONDOS: DID THE BUYER KNOW?

The purpose of this project is to ascertain if the tools prescribed in the Contract of Purchase and Sale adequately protect buyers in the re-sale transaction of condominiums in BC. If the tools are ineffective, what types of problems do they fail to detect? Is the lack of transparency due to failure of the tools, failure of the agent to include clauses mandating the tools, or some other reason?

**CMHC Project Officer :** Anand Mishra

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2525 0201001

**STATUS :** Ongoing

## COOPERATIVE AND NON-PROFIT HOUSING

### 2001 COOPERATIVE HOUSING SURVEY

The purpose of this project is to complete the required inspections under the 2001 cooperative housing survey, prepare reports and submit completed reports to the survey consultants.

**CMHC Project Officer :** Allan Dobie

**Division :** Audit and Program Evaluation Services

**AVAILABILITY :** Product is not yet available

**CIDN :** 2439 0501002

**STATUS :** Ongoing

### COOPERATIVE HOUSING PROJECTS IN DIFFICULTY

The purpose of this project is to analyze the causes of cooperative housing projects being in difficulty.

**CMHC Project Officer :** Graham Murray

**Division :** Audit and Program Evaluation Services

**AVAILABILITY :** Product is not yet available

**CIDN :** 2485 0500008

**STATUS :** Ongoing



## COOPERATIVE AND NON-PROFIT HOUSING

### COST OF COOPERATIVE HOUSING

The purpose of this project is to conduct a study of the cost of cooperative housing.

**CMHC Project Officer :** *Graham Murray*

**CIDN :** 2439 0501001

**Division :** Audit and Program Evaluation Services

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### EVALUATION OF COOPERATIVE HOUSING

The objective of this project is to conduct surveys for an evaluation of cooperative housing. Original data will be gathered from surveys of occupants of cooperative housing projects (and of occupants of other housing types for comparative purposes), from members of boards of directors and managers of housing projects, and from portfolio managers. In addition, an inspection of housing conditions will be completed by professional building inspectors.

**CMHC Project Officer :** *Graham Murray*

**CIDN :** 2485 0500001

**Division :** Audit and Program Evaluation Services

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### PUBLIC HOUSING TENANT SELF-MANAGEMENT: AN EVALUATION OF THE ALEXANDRA PARK CO-OP CONVERSION PROCESS IN TORONTO

The purpose of this project is to produce an independent review and analysis of the conversion process that has taken place at Alexandra Park/Atkinson Co-op.

**CMHC Project Officer :** *Vernon Barkwell*

**CIDN :** 2305 0200020

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### RISKING MODEL FOR COOPERATIVE HOUSING PORTFOLIO

This project's purpose is to identify the risks associated with the co-operative housing portfolio and the relative importance of these risks, etc. This project is in the final stages of review and should be completed by year-end.

**CMHC Project Officer :** *Brian Davidson*

**CIDN :** 2794 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### SITUATIONS DE CRISE DANS LES COOPÉRATIVES : MIEUX COMPRENDRE POUR MIEUX INTERVENIR

Housing cooperatives are home to 90,000 households in Canada. These units are owned by 2,100 cooperatives. In Quebec, there are approximately 1100 cooperatives which account for 23,000 members. Housing cooperatives in Quebec are smaller than those elsewhere in Canada, except in the Atlantic Provinces. They include a lot of "purchase-renovation projects" and rely on management consisting totally of volunteers in the vast majority of cases.

## COOPERATIVE AND NON-PROFIT HOUSING

Though housing cooperatives have been successful for the most part, some housing cooperatives have to cope with crisis situations. Although the vast majority of these cooperatives manage to emerge from their predicaments and restore financial and associative balance, others are confronted by enduring crises which compromise their existence. These crises are usually attributable to several factors, including problems relating to project involvement, finances, buildings and the associative and community living. The aim of this research is to understand the origin of these crises, the conditions that give rise to their emergence and solutions which can be put forward to resolve and, if possible, prevent them.

*Prepared by the Confédération québécoise des coopératives d'habitation. CMHC Project Officer: Marie Murphy. Ottawa: Canada Mortgage and Housing Corporation, 2002. (External Research Program Research Report)*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## DISCRIMINATION IN HOUSING

### HOUSING DISCRIMINATION IN CANADA: THE STATE OF KNOWLEDGE

This report is based on a review of research findings on housing discrimination in Canada, an assessment of the strengths and weaknesses of the research methods used, and a field consultation on current issues with informants from various stakeholder groups, e.g., landlord representatives, tenant advocates, real estate and financial representatives.

Much of the research has focused on perceptions of discrimination among ethno-racial minority groups. Generally, the studies are small-scale, use survey methods, use measures of perceived discrimination, and are limited to a few cities and to the rental sector. Findings from quantitative studies conducted from 1957 to 1996 show that racial discrimination is a continuing problem. More recent studies have documented discrimination against women. Other legally prohibited grounds for discrimination, e.g., family status, receipt of social assistance, age, disabilities, and sexual orientation, have not been part of any systematic research. Virtually nothing is known about discrimination in the housing sales market, mortgage lending, or home insurance.

There is widespread agreement that the existing data on housing discrimination are inadequate for directing policy decisions. This report concludes with a research agenda that would address current knowledge gaps.

*Prepared by Sylvia Novac, Joe Darden, David Hulchanski, and Anne-Marie Seguin with the assistance of Francine Bernèche. CMHC Project Officer: Phil Deacon. Ottawa: Canada Mortgage and Housing Corporation, 2002. 96 pages*

NOTE: No. 104 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

## HOME OWNERSHIP

### ENHANCING THE APPLICABILITY AND USEFULNESS OF CMHC'S HOMEOWNER'S MANUAL FOR NEW HOMES

This project's objective is to expand the content of the existing Homeowner's Manual to reflect a wider range of current house construction systems and components and to enhance the Manual with additional features in order to increase the usefulness of the manual for the home purchaser and its appeal to builders, realtors and home inspectors.

**CMHC Project Officer :** Fanis Grammenos

**CIDN :** 2493 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### IMPACT OF THE HOME BUYERS' PLAN ON THE DECISION TO BUY A HOME

This study is aimed at gaining an understanding of the impacts of the Home Buyers' Plan (HBP) on housing demand. It will clarify the following: Is the HBP a valid tool to facilitate access to homeownership? For which households is the HBP particularly worthwhile? What is the financial impact of RRSPs, especially on the issue of the best strategy between reducing mortgage debt or making RRSP contributions? If households use the HBP but do not repay their RRSP, could this jeopardize their long-term financial security?

**CMHC Project Officer :** Ian Melzer

**CIDN :** 2437 0200006

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## HOMELESSNESS

### APPLICABILITY OF A CONTINUUM OF CARE MODEL TO ADDRESS HOMELESSNESS

This project will examine the applicability to Canada of a continuum of care (CoC) model by conducting in-depth case studies of the CoC model in four American communities. The project will analyze the benefits and limitations of each CoC program and review its applicability in addressing homelessness in Canadian urban centres.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2353 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### AT HOME IN A COMMUNITY

The purpose of this project is to identify, based on a case study, the conditions, practices and characteristics of the Projet Aide au Logement (PAL), a supportive housing project, and undertake a more in-depth analysis of the cross-sectoral practices of the PAL.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2525 0201003

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***



## CAUSES AND CONDITIONS CONTRIBUTING TO FAMILY HOMELESSNESS AND APPROACHES TO ADDRESSING FAMILY HOMELESSNESS

This research project will provide an overview of the observable trends in the causes and conditions of family homelessness in Canada. Both the systemic/structural factors and the individual family circumstances that come to play in making families vulnerable to becoming homeless will be examined. As well, the project will investigate ways and means of addressing family homelessness through prevention, crisis intervention and re-integration strategies. Existing, emerging and innovative strategies which have proven effective or are in the vanguard of new initiatives will be reviewed. Those who provide assistance to and advocate for homeless or vulnerable families and families who are, or recently were homeless, will be consulted.

**CMHC Project Officer :** Jim Zamprelli

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## EVALUATING HOUSING STABILITY FOR PEOPLE WITH SERIOUS MENTAL ILLNESS AT RISK FOR HOMELESSNESS: FINAL REPORT

This report describes the development of a Housing Stability Benchmark Evaluation Procedure by the Community Support and Research Unit (CSRU) at the Centre for Addiction and Mental Health. Housing stability for people with serious mental illness (SMI) at risk of homelessness is a concept that has remained under-developed in the research literature. This project began by convening a Housing Stability Steering Committee. A primary task of the steering committee was to work with the CSRU study team to develop a model of housing stability. In addition, a scan of the published and non-published research and program evaluation literature was conducted to identify the factors at various levels that are associated with better housing outcomes for people with SMI.

Based on the model and findings from the scan of the literature, and working with the steering committee, a table of housing stability objectives, benchmark practices and monitoring strategies was developed. In addition, a series of data collection tools were created to complete a housing stability master data sheet. The tools are used to collect information about a housing program's practices. Once entered into a master data sheet, the program's practices are compared to housing stability benchmark practices. This comparison leads to the development of action plans to improve current program practices. The tools developed for this project were pilot-tested with three housing programs in Toronto representing custodial, supportive and supported housing models.

*Prepared by Community Support and Research Unit, Centre for Addiction and Mental Health. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Anna Lenk. Ottawa: CMHC, 2001. 206 pages*

NOTE: No. 100 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

## GOVERNANCE IN LOCAL PARTNERSHIPS TO ADDRESS HOMELESSNESS

This research will identify tools and strategies for problem-solving and decision-making within complex partnerships. This will be done by examining case studies of methods and structures of collaboration among community-based agencies and municipal governments, working on homelessness issues.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2426 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## INVOLVING HOMELESS AND FORMERLY HOMELESS CLIENTS IN PROJECTS AND PROGRAMS TO ADDRESS HOMELESSNESS: FINAL REPORT

This report is based on a study of the ways in which agencies that address homelessness involve their homeless clients in the work of the agency itself, through participation in governance structures, development of policies, work (both volunteer and paid), research and evaluation, building design and development, creative activities, community projects and training/mentorship activities.

The study examined the involvement approaches of twelve agencies in different locations across Canada. The agencies were selected to achieve good regional representation, as well as in terms of the services and programs provided and the characteristics of the homeless population served. Agencies providing services to adult women and men, youth, families and First Nations people were studied in Halifax, Fredericton, Trois-Rivières, Montréal, Toronto, Hamilton, Winnipeg, Regina, Calgary, Edmonton, Vancouver, and Victoria. The types of services provided include emergency shelter, drop-ins, supported housing, newsletter production, education/training, and counselling.

At each of the twelve sites, interviews and group discussions were conducted with management and front line staff and homeless clients of the particular agency. The final report examines the successes, pitfalls and future challenges of involving clients.

*Prepared by Jim Ward Associates. Funded jointly by Canada Mortgage and Housing Corporation and the National Secretariat on Homelessness. CMHC Project Officer: Jim Zamprelli. Ottawa: CMHC, October 2001. 63 pages*

**NOTE:** No. 98 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

## STUDY OF TENANT EXITS FROM HOUSING FOR CHRONICALLY HOMELESS PEOPLE

This project's objective is to study the current residents and the recent evictees from a Toronto agency that has a long history of providing innovative housing and related services for the chronically homeless and 'hard to house'. It is a study of the users of the services provided by the agency, not the agency itself.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2305 0200013

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## INDUSTRY PROFILE OF CANADIAN LIGHT STEEL BUILDING

This research will provide an overview of the current Canadian lightweight steel framing industry.

**CMHC Project Officer :** Jessica Li

**CIDN :** 2431 0900002

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## POTENTIAL ELEMENTS OF A HUMAN RESOURCES DEVELOPMENT STRATEGY FOR THE RESIDENTIAL CONSTRUCTION INDUSTRY

This project's objective is to briefly discuss the unique challenges confronting the housing sector in terms of labour supply and to outline the main components of a human resources development strategy for the residential construction industry. The paper is intended to form the basis of discussion at an upcoming facilitated workshop wherein the potential elements of a human resources development strategy for residential construction will be further refined and developed.

**CMHC Project Officer :** David D'Amour

**CIDN :** 2500 0100001

**Division :** Strategic Policy & Planning

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PRODUCTIVITY TRENDS IN THE CONSTRUCTION SECTOR IN CANADA: A CASE OF LAGGING TECHNICAL PROGRESS

The objective of this report is to provide a detailed examination of productivity trends in the construction industry in Canada, with particular reference to residential construction, in order to shed light on the lagging productivity in the sector.

Both labour and total factor productivity growth in the total and residential construction sectors in Canada have been negative over the past two decades. This report provides a detailed examination of output, employment, and productivity trends in the construction sector in Canada and by province, with particular attention to the residential construction sector. It puts forth a number of variables to explain these trends and tests these explanations in a regression model. In addition, the report looks at other potential explanatory factors for which time series are not available, with particular reference to measurement issues and technical change; discusses the micro- and macro-economic environment affecting productivity performance in the construction sector; examines the prospects for productivity growth in the construction sector; and makes a number of recommendations for future work. The major conclusion is that lagging technical progress appears to lie at the root of the construction sector's poor productivity performance. In addition, measurement problems have also likely contributed to the poor measured productivity performance in the sector.

*Final Report prepared by the Centre for the Study of Living Standards. CMHC Project Officer: Eric Tsang. Ottawa: Canada Mortgage and Housing Corporation, 2001. ca 350 pages*

**STATUS :** Completed Report

**AVAILABILITY :** On a loan basis only from: Canadian Housing Information Centre

## ROLE OF INDUSTRY STRUCTURE IN INDUSTRY PRODUCTIVITY

This project's objective is to complete a literature survey to analyse the extent to which industry structure is a driver in productivity growth.



## HOUSE CONSTRUCTION INDUSTRY

**CMHC Project Officer :** *Tan M Crombie*

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2553 0100001

**STATUS :** Ongoing

**\*NEW\***

### SUPPLY OF LABOUR IN THE RESIDENTIAL CONSTRUCTION INDUSTRY

The purpose of this project is to increase awareness and understanding of the impacts of labour shortages on housing markets, and to explore the information, tools and techniques required to better manage residential construction labour supply.

**CMHC Project Officer :** *David D'Amour*

**Division :** Strategic Policy & Planning

**AVAILABILITY :** Product is not yet available

**CIDN :** 2357 0100001

**STATUS :** Ongoing

## HOUSING

### DISINVESTMENT AND THE DECLINE OF URBAN NEIGHBORHOODS

Disinvestment and decline occur in inner city neighbourhoods throughout North America. The process is often associated with poverty, high levels of crime, conversion of single family to multi-family housing units, abandonment of the housing stock, and out-migration (movement of the middle class from inner city neighbourhoods to the suburbs). Other features of neighbourhood disinvestment and decline are mortgage redlining, exit of retail business, conversion to lower forms of non-residential land uses such as marginal business operations and specialized services for the poor, decline in relative or absolute land values, and in migration by economically marginalized populations.

This research examined the processes of urban disinvestment and decline with four objectives:

- to develop an understanding of forces and factors that trigger and accelerate decline;
- to create a framework for action that can stem and reverse decline;
- to examine the role of investment in housing as a primer of regeneration; and
- to identify opportunities for concrete action involving partnerships.

The research aims to inform the development of public policy, primarily at the local and municipal levels, by articulating a range of policies that can work to prevent or reverse inner city decline.

The research comprises four main sources of information: a literature review, key informant interviews in six cities, group interviews in two cities, and analysis of Statistics Canada data. Together, the case studies: examine the extent to which the experience of the six selected cities conforms to the literature; identify the range of responses to urban decline being implemented in the Canadian context and evaluate them; and identify best practices in urban revitalization and renewal.

*Ottawa: Canada Mortgage and Housing Corporation, 2001. (Research Highlight: Socio-Economic Series; 90). 6 pages*

**NOTE :** Aussi disponible en français sous le titre : Le désinvestissement et le déclin des quartiers en milieu urbain

**STATUS :** Completed Research Highlight Order number: 62512

**AVAILABILITY :** CMHC Information Products and on CMHC's web site

## ENVIRONMENTAL SCAN OF HOUSING SECTOR GIS PRACTICES

This project's objective is to perform an environmental scan of housing sector GIS practices.

**CMHC Project Officer :** Roger Mareschal

**CIDN :** 2392 1000001

**Division :** Market Analysis Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING NEEDS OF LOW-INCOME PEOPLE LIVING IN RURAL AREAS

This project is intended to be a preliminary investigation of the housing needs of low-income people living in rural areas, including the existence of homelessness. The methodology includes a statistical profile, mainly from the Census, but supplemented by any surveys which have been done by the provinces/territories and by qualitative research to more finely identify issues affecting very low income or otherwise vulnerable households.

**CMHC Project Officer :** Anna Lenk

**CIDN :** 2367 0200

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## IDENTIFICATION OF KNOWLEDGE GAPS IN DISASTER INFORMATION FOR HOUSEHOLDERS IN CANADA: FINAL REPORT

This short survey project assembled and reviewed existing housing information related to 'disasters' to assess if and where additional research may be required. The review concentrated on housing and housing issues. This research investigates information prepared for householders by organizations in Canada, the United States, Britain, Australia and France. Material was collected and analyzed for the following fifteen threats: avalanches; cold waves; drought; earthquakes; forest fires; house fires; flooding; hail; heat waves; landslides/mudslides; multiple coverage; power outages; tornadoes, torrential rain; and winter storms. The report assesses the suitability of the information for the intended audience and identifies gaps in the current consumer information.

*Prepared by John Newton. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Don Fugler. Toronto: John Newton Associates, 2001. 82 pages*

**STATUS :** Completed Report

**AVAILABILITY :** On a loan basis from: Canadian Housing Information Centre

## INTERGENERATIONAL HOUSING TRENDS AND CHALLENGES

This project's objective is to complete an issue paper on intergenerational housing trends and challenges.

**CMHC Project Officer :** Leanne Elliott

**CIDN :** 2409 0100001

**Division :** Policy and Research Division

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

### **NATIONAL CONSULTATION TO EVALUATE "HOME\$AVE" AN ASSET-BASED APPROACH TO ANTIPOVERTY USING HOUSING AS A CATALYST**

The objective of this project is to undertake a consultation to evaluate an asset-based antipoverty strategy using housing as a catalyst. The Home\$ave consultation will validate the assumption that low-income individuals will respond to financial incentives to engage in a range of activities related to housing.

**CMHC Project Officer :** Eric Tsang

**CIDN :** 2498 0100001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### **SPECIAL STUDIES ON 1996 CENSUS DATA**

This project is composed of developing a series of concise studies that explore the housing conditions reported in the 1996 Census of Canada. Nine studies are currently completed and available on the CMHC web site:

- Research Highlights Issue 55-1 Canadian Housing Conditions uses data primarily at the national level, explains commonly used terminology, and examines the largest groupings of households.
- Research Highlights Issue 55-2 Housing Conditions in Metropolitan Areas examines Canada's 25 Census Metropolitan Areas.
- Research Highlights Issue 55-3 Housing Conditions of Immigrants discusses the housing conditions of households whose primary maintainer is an immigrant to Canada.
- Research Highlights Issue 55-4 Housing Canada's Children examines the housing environment of Canada's children.
- Research Highlights Issue 55-5 Changes in Canadian Housing Conditions, 1991-96 examines changes in the housing conditions of non-farm, non-Native households between the 1991 and 1996 Censuses.
- Research Highlights Issue 55-6 Housing Conditions of Native Households examines the housing conditions of households defined as Native using the self-identification definition available in the Census for the first time in 1996.
- Research Highlights Issue 55-7 Canadian Households in core housing need and spending at least half their income on shelter, profiles the characteristics of these Canadian households which in 1996 constituted under 7% of the 9.8 million households studied, or about 38% of the 1.7 million households in core housing need.
- Research Highlights Issue 55-8 Seniors' Housing Conditions examines the housing conditions of households led by persons 65 years of age or older. Most senior-led households are well-housed: about 79% (1.6 million households) occupy or could afford to occupy, housing which meets or exceeds all housing standards. However, 442,000, or 21% of senior-led households were in core housing need, with 64% of these being tenants.
- Research Highlights Issue 55-9 examines the housing conditions of women and girls, and of households with a female primary maintainer. About 84% of women and girls in Canada lived in households that were, or could have afforded to be, well-housed. However, 16%, or 2.1 million females, lived in households in core housing need, a higher proportion than for males (13%). Two key groups of female-led households have high rates of core housing need: women living alone and female single parent households.

**CMHC Project Officer :** Ian Melzer

**CIDN :** 1988 0200003

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Research highlights are available



## HOUSING AFFORDABILITY

### ACT REGIONAL STAKEHOLDER INFORMATION SESSIONS

Ten information sessions were held across Canada to inform housing stakeholders of regulatory reform solutions that have been generated under the Affordability and Choice Today program. The intent was to encourage replication of these solutions. Stakeholders included municipalities, home builders, non-profit housing groups and other housing specialists. Forums were held in Saint John, Halifax, Quebec, Montreal, Toronto, Sudbury, Winnipeg, Saskatoon, Vancouver and Victoria.

**STATUS :** Completed

**AVAILABILITY :** There will be no product for this project

### AFFORDABLE HOUSING ADVISOR

This project will assemble an electronic database of strategies and ideas that have been successfully used to improve housing affordability for inclusion on CMHC's web site. These strategies will appear under categories of activity such as: Policy and Regulation; Housing and Community Design; Construction and Technology; Operations and Management; and Redevelopment. Each strategy will be explained and illustrated with example projects. When completed, it is intended that the database will be accessible through the CMHC web site and will be fully searchable and linked to relevant sources of information of the strategies and examples. The sources will include CMHC reports, publications by other organizations and individuals and web sites of public, non-profit and non-government organizations.

**STATUS :** Completed

**AVAILABILITY :** Product is available on the web

### AFFORDABLE HOUSING COMPONENT OF CMHC'S WEB SITE

The objective of this research project is to enhance the affordable housing component on CMHC's web site in order to provide practical information, guidance and access to ancillary related information/reference materials to affordable housing sponsors, builders, architects, local governments, and to others interested in the provision of affordable housing. The scope of the project includes:

1. researching and writing descriptions of affordable housing projects highlighting the innovative measures and approaches used by project sponsors in undertaking such projects ; and
2. identifying additional Canadian web sites which contain useful information and resource material for those interested in creating affordable housing, and then preparing brief summary descriptions of the content of both these new as well as existing web sites already included within the affordable housing component of CMHC's web site.

**CMHC Project Officer :** Fanis Grammenos

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2430 0200002

**STATUS :** Ongoing

**\*NEW\***

### AFFORDABLE HOUSING IN VANCOUVER FOR PEOPLE LIVING WITH HIV/AIDS = DES LOGEMENTS ABORDABLES À VANCOUVER POUR LES PERSONNES VIVANT AVEC LE VIH/SIDA

Wings Housing Society opened the Bonaventure, an affordable housing project for persons living with HIV and AIDS, on January 21, 1999. This project took less than one year from conception to ribbon snipping. The speed at which this project was brought on stream reflects the housing crisis being faced by hundreds of Vancouver residents living with HIV disease. The Bonaventure provides housing for 57 people in roomy, affordable apartments located adjacent to some of the

## HOUSING AFFORDABILITY

country's best clinical and social support services. This report chronicles the conception and implementation of the Bonaventure project and highlights the use of innovative renovation of existing historic buildings with unusually high density allowances as a way to provide affordability, choice and quality housing to some of Canada's most marginalized individuals.

*Case study written by Katherine Taylor, Options Consulting, Wings Housing Society. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2001. (Affordability and Choice Today (ACT) Demonstration Project. ACT Case Study) 35 pages*

**STATUS :** Completed Report; Order number: 62340

**AVAILABILITY :** CMHC Information Products

## REFINING OF CMHC HOUSING AFFORDABILITY INDICATORS

The purpose of this project is to undertake a study to refine CMHC housing affordability indicators.

**CMHC Project Officer :** Louis Trottier

**CIDN :** 2320 1000001

**Division :** Market Analysis Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING AND IMMIGRATION

### METROPOLIS CENTRES OF EXCELLENCE FOR RESEARCH ON IMMIGRATION ISSUES

CMHC and other federal departments provide ongoing financial support to stimulate and support policy-relevant research on immigration issues, through a network of research centres in Canadian universities, (Centres of Excellence). The research produced will be used for the assessment of and development of policies and programs affecting immigrants and new Canadians. As an example, CMHC should benefit from planned projected research to be undertaken by the Centres in such areas as:

1. the effect of immigration on housing markets, demand and supply;
2. the effect of immigration on urban development, including issues of renewal of the urban core;
3. the impact of immigration on housing need, affordability, homelessness and the demand for social housing;
4. the social and spatial mobility of immigrants as compared with the profiles of the Canadian-born;
5. the relationship between immigration and the formation of ethnic, cultural or religious enclaves; the dynamics of enclaves - their role in integration (bridging or isolating), their economic role, their effect on city life, on urban renewal, on public safety, and so forth;
6. the relationship between metropolitan infrastructure (the quantity, quality and distribution of housing and public space) and immigrant integration.

Information on Metropolis and on the almost 200 funded research projects can be found at [canada.metropolis.net](http://canada.metropolis.net).

**CMHC Project Officer :** Jim Zamprelli

**CIDN :** 2564 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is available on the web

## HOUSING AND IMMIGRATION

### STUDY ON THE RESIDENTIAL INTEGRATION OF IMMIGRANT YOUTH IN MONTRÉAL

The purpose of this project is to study and propose solutions to the problem of integrating immigrant youth in Montréal.

**CMHC Project Officer :** Kim-Anh Lam

**CIDN :** 2316 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING AND TAXATION

### EVALUATION OF HOUSING TAXATION MEASURES

This report evaluates income tax and GST measures affecting the housing industry based on the principles of taxation: effectiveness, efficiency, equity, affordability and integrity.

In addition to reviewing the principles of taxation, the report discusses recent trends in tax policy, the rationale for the current treatment of income from property (which includes rental income) vis-à-vis income from a business, the conceptual basis for providing tax preferences, and real estate as a tax shelter, and presents a profile of the participants in the housing sector.

The discussion of the housing measures outlines the implications, rationale and history of each measure. The Department of Finance distinguishes between activities which are "active" and those which are "passive" in nature. The fundamental conceptual issue throughout the report is the different treatment of rental property income (passive income) and income from a business (active income). *Ceteris paribus*, passive income bears a higher tax burden than active income, which benefits from tax preferences not available to passive income. The housing industry has argued for tax preferences for rental income and rental properties similar to those available to business income and business properties.

Based on the evaluation of principles, all existing tax measures are deemed to have largely attained the effectiveness and equity principles. Certain deficiencies are noted with respect to the efficiency principle. Several measures are considered to have partially attained the affordability principle, primarily because they reduce the quantum of re-investment funds available to the rental property owner.

*Prepared by F.B. Gorman & Associates Limited. CMHC Project Officer: Eric Tsang. Ottawa: Canada Mortgage and Housing Corporation, 2002. 143 pages*

NOTE: No. 106 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** New Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre



## HOUSING AND TAXATION

### TAXATION OF RESIDENTIAL PROPERTY IN CANADA

The system of taxation in Canada has become increasingly complex over the past several decades. Taxes include federal, provincial and municipal, or local, taxes. The federal government levies personal and corporate income taxes, other corporate taxes like payroll and capital taxes, a value-added tax (the Goods and Services Tax), and excise taxes. The provincial governments also collect personal and corporate income taxes, but generally follow the rules set out by the federal government. Provincial governments also levy sales taxes or participate in the federal value-added tax and collect taxes such as land transfer taxes. Local governments generally only collect property taxes and certain fees.

Many of these taxes affect the production, ownership and use of housing, and decisions surrounding these functions. This report sets out and explains tax provisions relating to housing providers, owners and renters. Section 2 presents the taxation of producers (e.g., home builders and multiple-unit residential builders.) Section 3 identifies the taxation of owners of rental housing (e.g., corporations -- both principal business corporations and not, real estate investment trusts, and individuals). Finally, section 4 discusses the taxation of the occupant individuals of owned and rented housing. Section 5 summarizes the criteria, methodology, and possible research questions that could be explored, with particular focus on the taxation of the providers of rental housing. By presenting the tax provisions by economic function, rather than by taxation type, the focus is comparisons across alternative forms that these economic activities take, as well as providing a better framework to analyze the impact of the tax provisions on housing-related economic activities.

*Prepared by Kenneth J. Klassen and Stanley N. Laiken. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Eric Tsang. Ottawa: CMHC, 2001. 66 pages*

NOTE : Aussi disponible en français sous le titre : Imposition des immeubles résidentiels au Canada

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## HOUSING EXPORT OPPORTUNITIES

### CANADIAN BUILDING PRODUCT DISTRIBUTION CENTRE IN SOUTHERN CHINA

This project's purpose is to conduct a detailed feasibility plan to establish a Canadian building product distribution centre in southern China.

**CMHC Project Officer :** Marion A Rasmussen

**CIDN :** 2174 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### CANADIAN HOUSING EXPORTERS IN THE KOREAN HOUSING MARKET

The objective of this project is to analyze the Korean housing market and to identify market potentials and opportunities for Canadian housing exporters in the Korean housing market.

**CMHC Project Officer :** Jay Thakar

**CIDN :** 2332 0900001

**Division :** CMHC International

**STATUS :** Planned

**AVAILABILITY :** Product is not yet available

## HOUSING EXPORT OPPORTUNITIES

### CONTRIBUTION TO A STUDY ON PACIFIC RIM MARKETS FOR TERMITE-RESISTANT WOOD PRODUCTS

The objective of this project is to study the Pacific Rim markets for termite-resistant wood products.

**CMHC Project Officer :** Jay Thakar

**CIDN :** 2104 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### DEVELOPMENT OF A GUIDE TO THE UNITED KINGDOM BUILDING REGULATIONS

The objective of this project is to develop a guide on the building regulations in the United Kingdom.

**CMHC Project Officer :** Terry Robinson

**CIDN :** 1953 0900

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### DEVELOPMENT OF AN EXPORT TOOL-KIT FOR CHINA

This project's objective is to prepare a comprehensive assessment and collection of information pertaining to the export of Canadian housing product to China.

**CMHC Project Officer :** Murray Rasmussen

**CIDN :** 2347 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### GUIDE TO THE RULES UNDER THE NORTH AMERICAN FREE TRADE AGREEMENT AND U.S. IMMIGRATION LAW FOR CANADIAN COMPANIES IN THE HOUSING, RENOVATION AND RESIDENTIAL CONSTRUCTION SECTOR

This guide outlines the procedures as well as the criteria for those currently engaged in residential renovation, manufactured housing production, and the construction of on-site residential homes that must be met for those seeking temporary entry to the United States under the North American Free Trade Agreement (NAFTA) and U.S. immigration law. This guide is intended to provide general information about the NAFTA and U.S. immigration rules and regulations. Questions most asked by Canadian new home builders, manufacturers and renovators are included as a preamble to the guide.

*Ottawa: Canadian Home Builders' Association, Canadian Manufactured Housing Institute with the assistance of Canada Mortgage and Housing Corporation, 2000. vi, 28 pages*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Home Builders' Association

## HOUSING EXPORT OPPORTUNITIES

### HOUSING MARKET GUIDES ON FOUR CITIES IN THE UNITED STATES

This project's objective is to prepare individual Market Guides for four cities in the United States: Boston, Chicago, Dallas, and Seattle.

**CMHC Project Officer :** Sanjar Farzaneh

**CIDN :** 2466 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### HOUSING MARKET RESEARCH: OPPORTUNITIES FOR CANADIAN TRAINING PROGRAMS IN CHINA

The objective of this project is to research the needs and market potential of training programs in the housing sector in China, in order to respond to an emerging demand by Canadian exporters and Chinese clients.

**CMHC Project Officer :** Marion A Rasmussen

**CIDN :** 2455 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### JAPANESE CONSUMERS BASED ON NINE PERFORMANCE INDICATORS

The purpose of this project is to carry out a study segmenting Japanese consumers based on nine performance indicators.

**CMHC Project Officer :** Laura Diakiw

**CIDN :** 2494 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### PREFABRICATED HOUSING IN SWEDEN AND FINLAND

This trip was organized as part of the Forintek/Concordia collaborative project aimed at identifying issues and trends affecting the prefabricated industry sector. The Scandinavian countries and Finland are recognized for their expertise with the prefabrication of building products. Similarly to Canada, Sweden and Finland rely on abundant forest resources, have small internal markets and are net exporters of prefabricated homes to other countries.

During this trip the authors visited five prefab manufacturing plants, one equipment manufacturer, a construction exhibition, a home construction site, one university, and two research institutes involved with the industry of prefabricated systems in Sweden and Finland. The objective of this trip was to study practices followed by the industry of prefabricated building systems in the two countries and investigate the type of research activities undertaken by the research institutions to support this industry sector. This report summarizes the key findings of the plant visits and interviews with researchers.

*Prepared by Paul Fazio and Louis Poliquin. Ottawa: Canada Mortgage and Housing Corporation, 2002, c2000. 56 pages*

Note : Aussi disponible en français sous le titre : Habitations préfabriquées en Suède et en Finlande

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



## HOUSING EXPORT OPPORTUNITIES

### STUDY OF THE MIDWEST BUILDING PRODUCTS MARKET IN THE REGIONS OF ILLINOIS, WISCONSIN AND MISSOURI

The purpose of this project is to undertake a study to provide Canadian companies with a general overview of the market forces within the building products sector in the three state regions of Illinois, Wisconsin, and Missouri.

**CMHC Project Officer :** Carol M Kerley

**CIDN :** 2172 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### TIPS ON SELLING IN THE U.S. GREEN HOUSING MARKET

Do you have a housing system or building product that reduces environmental impacts or contributes to occupant health and safety? There may be a market for you in the United States.

Housing markets in the United States are increasingly adopting a build green strategy to give consumers what they want. Canada Mortgage and Housing Corporation (CMHC) prepared this booklet to help you tap into those markets. The booklet provides a definition of green building, outlines basic steps to take to learn about the U.S. green housing market, and includes a listing of green building programs. It covers distributors and retailers, directories and product certification, conferences and events, key contacts and other marketing considerations.

*Ottawa: Canada Mortgage and Housing Corporation, 2002. 36 pages*

NOTE : Publié aussi en français sous le titre : Conseils pour vendre dans le marché de la construction écologique aux États-Unis

**STATUS :** Completed Report    Order number: 62870

**AVAILABILITY :** CMHC Information Products and on CMHC's web site

### UPDATE OF THE STUDY ON MID-ATLANTIC BUILDING MATERIALS MARKET

To support an update of the study entitled "Business Opportunities for Canadian Building Materials Manufacturers in the Mid-Atlantic Region of the U.S. of America" with new actual and forecast data.

**CMHC Project Officer :** Carol M Kerley

**CIDN :** 2228 0900001

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### USER INTERFACE FOR CD-ROM ON MARKET GUIDES TO THE U.S.

This project's objective is to design the interface for users of a CD-ROM containing market guides to the United States and to convert the files for transfer on the CD-ROM.

**CMHC Project Officer :** Louis Musto

**CIDN :** 1953 0900012

**Division :** CMHC International

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING FORECASTING AND DEMAND

### ESTIMATION OF CORE HOUSING NEED USING THE SURVEY OF HOUSEHOLD SPENDING MICROFILE

This External Research Program project is aimed at developing a methodology for tracking housing conditions and need between censuses using the latest (1999) Survey of Household Spending (SHS) file. The contractor will carry out research at Statistics Canada with the internal SHS working file to examine how to apply CMHC's indicators for housing affordability, adequacy, and suitability and the integrated indicator of core housing need to the SHS. The contractor will, in the process, identify and examine the nature of any problems associated with small SHS sample size, suggesting workarounds where possible, at the same time as evaluating the longer term potential to expand the survey sample.

**CMHC Project Officer :** John E Engeland

**CIDN :** 2437 0200016

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING MARKET

### ETHNIC CHANGES AND THE HOUSING MARKET IN RIVIÈRE-DES-PRAIRIES, MONTRÉAL

This project's objective is to provide an understanding of the residential building depreciation mechanism in order to find out the share of the effects of ethnicity in relation to the general economic conditions prevailing on the market in Rivière-des-Prairies, Montreal.

**CMHC Project Officer :** Philippe LeGoff

**CIDN :** 2437 0200007

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### IMPACT OF CONVERSIONS OF RENTAL TO OWNERSHIP UNITS ON HOUSING MARKETS IN ONTARIO

This study seeks to generate a framework for addressing the changes in the availability of affordable housing stock in large Ontario cities through conversions of rental units and, by extension to understand the impact of these conversions on other components of the housing market, in particular the new homes market.

**CMHC Project Officer :** Alain Miguez

**CIDN :** 2226 1000001

**Division :** Market Analysis Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### INVESTOR CONDOMINIUM MARKET IN VANCOUVER, BURNABY, AND RICHMOND

The objective of this project is to undertake a detailed study of the investor condominium market in Vancouver, Burnaby, and Richmond. The study will identify the number of investor condominiums in these areas, as well as the rental rates and vacancy rates.

**CMHC Project Officer :** Cameron Muir

**CIDN :** 2283 1000001

**Division :** Market Analysis Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING MARKET

### STUDY ON THE RESIDENTIAL PATH OF PEOPLE AGED 45 TO 64 YEARS IN THE MONTRÉAL AND QUÉBEC CENSUS METROPOLITAN AREAS (CMAS)

This project's objective is to provide a study on the residential path of people aged 45 to 64 years in the Montréal and Québec census metropolitan areas (CMAs).

**CMHC Project Officer :** Sandra S Girard

**CIDN :** 2293 1000001

**Division :** Market Analysis Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### SURVEY AND LITERATURE REVIEW OF SOCIOECONOMIC TRENDS AFFECTING CONSUMERS AND HOUSING MARKETS

This research project will review what is known and what has been analyzed in regard to important existing and emerging socioeconomic trends and how they might affect consumers and housing markets over the next 5 years. The contractor will provide views regarding what additional research could be undertaken which would address identified information research gaps in this area.

**CMHC Project Officer :** Ian Melzer

**CIDN :** N/A

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## HOUSING RESEARCH

### DIRECTED RESEARCH EVALUATION REPORT

This study investigated the economic benefits of the Directed Research (DR) and related information transfer of the Canada Mortgage and Housing Corporation (CMHC). The intent was to determine whether there is a positive economic return to Canadian society from CMHC's investment in the DR. This study was commissioned in response to a Treasury Board request for a further evaluation of CMHC's research, information and communications function following a 1994 evaluation study. The 1994 evaluation concluded that DR was relevant and produced high quality and useful research. The current study builds on that earlier evaluation by seeking to quantify the benefits of CMHC's DR. It does not include analysis of other CMHC research: e.g., for market analysis and export development, or CMHC's Responsive Research Programs (the External Research Program and the Housing Awards Program).

This study used a partial benefit/cost (B/C) methodology that compared the benefits of a small number of research areas expected to have large net benefits to the total costs of CMHC DR. An iterative process was used to identify cases in which the benefits were likely to be large, the benefits could be quantified in dollar terms, there was a discrete set of uses and users for the research results, the impacts could be clearly attributed to use of the research results or participation in the research, and CMHC's DR had a significant role in creating the impacts. Four cases of research impacts were investigated in detail, and five other cases were also examined at the study design stage. The four cases for which net benefits were estimated were British Columbia wood-frame moisture damage, brick veneer steel studs, mandatory fire sprinklers, and northern water microsystems.

The findings indicate that CMHC's DR will likely provide significant benefits to Canada over the next several decades, and represent a positive return from CMHC's housing research.



## HOUSING RESEARCH

Prepared by KPMG Consulting LLP for Audit and Evaluation Services. Ottawa: Canada Mortgage and Housing Corporation, November 2001. 36 pages

NOTE : Aussi disponible en français sous le titre : Rapport d'évaluation de l'activité de recherche commandée

**STATUS :** Completed Report      **AVAILABILITY :** Product is available on the web

## MORTGAGES AND HOUSING FINANCE

### DISCLOSURE REQUIREMENTS IN MORTGAGE LENDING AND SUPPORT TO BORROWERS IN OBTAINING THE BEST MORTGAGE TERMS

The purpose of this project is to assess the extent to which Canada's mortgage lending and consumer protection legislative and regulatory framework, and industry practice in terms of disclosure and borrower support, enhances the chances of obtaining mortgage funding on terms consistent with the risk presented by the borrower's circumstances. The study will compare the lending framework and practices in the US and Canada, etc.

**CMHC Project Officer :** Ian Melzer

**CIDN :** 2525 0201005

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### EVOLVING IMPACT OF E-COMMERCE ON HOUSING FINANCE ACCESS AND AFFORDABILITY: US EXPERIENCE AND LESSONS FOR CANADA

The objective of this research is to examine the significant changes arising in the housing finance market place resulting from e-commerce and their impact on housing finance access and housing affordability. An overview of experience to date and international comparisons with the US will be instructive to Canadian stakeholders being impacted by this growing trend.

The research project will entail a literature review, Internet searches, interviews and discussions with knowledgeable US and Canadian industry participants, government regulatory agencies, housing sector stakeholders and other key informants.

**CMHC Project Officer :** Ian Melzer

**CIDN :** 2389

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PERSONS WITH DISABILITIES

### DETERMINING THE EFFORT NEEDED BY ADULTS AND SENIORS TO CLIMB RAMPS USING MANUAL WHEELCHAIRS

The objective of this research is to determine the effort needed by adults and seniors to climb ramps using manual wheelchairs.

**CMHC Project Officer :** Luis Rodriguez

**CIDN :** 2305 0200019

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## PERSONS WITH DISABILITIES

### EXAMINING THE HOUSING CHOICES OF INDIVIDUALS WITH DISABILITIES

Many individuals with disabilities are concerned about the limited types of housing options available for persons with disabilities. However, information on the living arrangements and housing preferences of individuals with disabilities is limited. To begin to understand the situation better, this exploratory survey research study examines the housing choices of persons with mobility and/or agility disabilities living in Regina. The study provides information on the current living arrangements of individuals with disabilities; determines if there are individuals who could benefit from more accessible housing; explains what the term "more accessible housing" means in Regina and develops a profile of those people who could benefit from more accessible housing.

*Prepared by Janice Solomon. This study was managed by the City of Regina with advice and assistance from the Advisory Committee on Access and the Department of Sociology and Social Studies, University of Regina. CMHC Project Officer: Thomas Parker. Ottawa: Canada Mortgage and Housing Corporation, 2002. (External Research Program Research Report) ca. 38 pages*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### MAJOR MAINTENANCE AND RESIDENTIAL RENOVATION: A SURVEY OF MEANS TO IMPROVE THE ARCHITECTURAL ACCESSIBILITY OF EXISTING BUILDINGS

The objective of this project is to study the extent to which it is possible to integrate architectural accessibility into existing residential buildings during major maintenance or common renovation work planned by an owner.

**CMHC Project Officer :** Rachelle Luengas

**CIDN :** 2021 0200001

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### SPACE EFFICIENT UNIVERSAL DESIGN INNOVATIONS

The research will evaluate design innovations which have been developed specifically to enhance access for people who use wheelchairs.

**CMHC Project Officer :** Thomas Parker

**CIDN :** 2009 0200001

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## POPULATION HEALTH

### DEVELOPMENT OF A RESEARCH FRAMEWORK FOR POPULATION HEALTH AND HOUSING

The National Housing Research Committee is interested in the possible links between housing and health status at the population level. This project begins to address the lack of comprehensive research in the area. More specifically, it will summarize what is known using existing literature

## POPULATION HEALTH

reviews, recent unreviewed literature, current work underway. Based on this, the project will: develop a theoretical framework using accepted concepts and definitions where they exist, assess the difficulties of research in this area and identify areas with most promise, assess institutional research capacity for mounting a program of research in this area, and write a research proposal, for submission to a funding body, whereby NHRC could partner.

**CMHC Project Officer :** Phil Deacon

**CIDN :** 2489 0600001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## REGULATORY REFORM

### OPPORTUNITIES FOR IMPROVING THE INSPECTIONS PROCESS, CITY OF VANCOUVER, BRITISH COLUMBIA = OCCASIONS D'AMÉLIORER LE PROCESSUS D'INSPECTION, VILLE DE VANCOUVER (COLOMBIE-BRITANNIQUE)

In the mid-1990s, the building regulatory process in Vancouver was identified as very complex and time consuming. Although the major duplication and red tape issues were found in the planning approval process, building inspections could also be a problem. Trade and building inspection functions were separate, data recorded in the field had to be re-recorded later, information needed on site was only available at the municipal office, and interpretation of requirements could vary from one person to another.

In 1994, the City of Vancouver started an ambitious program to fundamentally change and improve its services, an initiative it called the "Better City Government Program." Redesign of the planning and inspections process represented a central element of this program. Within the inspections area, a team was set up to re-think what the goals and functions of construction site inspections really were, and how they could best be accomplished.

The project produced benchmarking information of best practices, based on six other municipalities in Canada, the United States and Australia, plus the Workers' Compensation Board of British Columbia. The team also produced a proposed process for inspections, including flow charts that concentrated on value-added work and expanded the responsibilities of inspectors. Their "Day-in-the-Life" description emphasized site use of cell phones, laptop computers and modems. They also produced a business case, with plans for implementation and cost recovery. Through an assessment of field technologies, field staff isolated pros and cons of different computerized systems and produced practical criteria for judging equipment in the future.

Actual implementation has been delayed by a rethinking of the reorganization of the planning and permitting process. Many elements were also put on hold pending decisions on a major new computerization of Vancouver's overall geographic and permitting functions. However, the project has produced a body of information which leaves the inspections department well positioned to pursue change when those two initiatives are completed. Also, a new "team approach" has been instituted for complex new projects and renovations. So far, the main results have been in speeding up development approvals.

*Prepared by Rowena E. Moyes. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2001. (Affordability and Choice Today ACT Regulatory Reform Project; ACT Case Study) 31 pages*

Order number: 62326

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products



### HISTORY OF CANADA'S RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP)

The Residential Rehabilitation Assistance Program (RRAP) was announced by the Government of Canada in the spring of 1973 and became operational the following year. It came about because of the dual recognition that the existing housing stock represented an important national asset that needed to be preserved, and that a significant portion of this stock was substandard and occupied by households unable to afford necessary repairs. Over the following 26 years, more than 600 000 dwellings, mostly comprised of self-contained homeowner and rental units, but also a good number of beds in hostels, dormitories, special care facilities and rooming houses, were repaired with RRAP assistance across all regions and areas of the country. During this time, RRAP demonstrated great versatility in adapting to the priorities of the day in achieving a broad range of public objectives from improving the housing conditions of low-income Canadians, neighbourhood improvement and employment generation, to meeting the special needs of persons with disabilities and the homeless.

This history is divided into two main parts. The first recounts the evolution of RRAP from its inception to the present day. The second part explores the evolution of critical aspects of RRAP related to need, its design, management and accomplishments, and concludes with an epilogue which reviews reasons for RRAP's durability and explores the need for targeted housing rehabilitation programs in the future.

*Prepared by Dale Falkenhagen for Canada Mortgage and Housing Corporation. CMHC Project Officer: Brian Davidson. Ottawa: CMHC, December 2001. xviii, 196 pages*

Note : Aussi disponible en français sous le titre : Histoire du Programme d'aide à la remise en état des logements (PAREL) du Canada

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### RENTAL, ROOMING HOUSE AND NON-RESIDENTIAL CONVERSION COMPONENTS OF THE RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP PHASE I)

This project's objective is to evaluate the rental, rooming house and nonresidential conversion components of the Residential Rehabilitation Assistance Program to assess the rationale for and impacts of these program components from 1995 to 2000 inclusive.

**CMHC Project Officer :** Connie J Wilson

**CIDN :** 2785 0500001

**Division :** Audit and Program Evaluation Services

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP PHASE II)

The purpose of this project is to conduct an evaluation of the Homeowner and Persons with disabilities components of the Residential Rehabilitation Assistance Program (RRAP) Phase II.

**CMHC Project Officer :** Eva Berringer

**CIDN :** 2785 0501001

**Division :** Audit and Program Evaluation Services

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## RENOVATION AND INSPECTION

### UNDERSTANDING THE MOTIVATIONS OF HOMEOWNERS TO CONVERT THEIR BUNGALOWS IN QUÉBEC CITY SUBURBS

This research will study the motivations that bring homeowners in Québec City suburbs to convert their bungalows. The objectives of this research are to clarify the decision-making process associated with the home conversion projects so as to subsequently develop a theoretical conceptual model apt to describe household behaviour.

**CMHC Project Officer :** Pascal Yvan Pelletier

**CIDN :** 2437 0200021

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RENTAL HOUSING

### ASSESSMENT REPORT ON RENTAL HOUSING TAXATION IN CANADA

The objective of this project is to write an assessment report on rental housing taxation in Canada which will identify all rental housing and related tax provisions; explain how each of these rental housing and related tax operates, including the use of illustrative numerical examples in each and every case; and discuss the generally-accepted criteria and a feasible methodology for determining the appropriateness of the current taxation regime applicable to rental housing.

**CMHC Project Officer :** Eric Tsang

**CIDN :** 2405 0100002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ETHICAL AND SOCIAL FUND INVESTMENTS IN LOWER-TO-MODERATE INCOME AFFORDABLE RENTAL HOUSING IN CANADA: AN ASSESSMENT

This study assesses the feasibility of encouraging equity investment in affordable lower-to-moderate income rental housing (ARH) in Canada, within the framework of a public-private partnership (PPP) model, via ethical or socially responsible investment (SRI) funds and pension funds. The study examines the U.S. model for ARH PPP arrangements, with particular emphasis on the features that relate to equity investment. The structure of the ethical investment industries in both the U.S. and Canada are examined in detail. A number of specific reviews of fund investment structures in the U.S. are undertaken, and the results of a survey of funds in Canada are presented. The regulatory/legislative and investment environments in Canada are assessed. The study explores a number of options for structuring equity investments for ethical funds in Canada. The primary conclusion of the study is that such investments are conceptually feasible but that both the U.S. and Canada have a long way to go in developing the investment framework and incentive structure to facilitate such investments.

*Prepared by Alex S. MacNevin. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Lisa Daher. Ottawa: CMHC, 2002. (External Research Program Research Report) 134 pages*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### HOUSING STABILITY INDICATORS AND IMPACTS

This research initiative will survey between 700 and 1,000 renter households in Greater Vancouver to begin to develop a better understanding of the overall level of housing stability/instability that exists among renter households

**CMHC Project Officer :** John E Engeland

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2525 0201015

**STATUS :** Ongoing

**\*NEW\***

### INTERVENTIONS FOR ROOMING HOUSES, SROS AND TENANTS: FINAL REPORT

Outside of social housing, rooming houses and single room occupancy (SRO) units are the least expensive form of permanent housing, and essential for very low-income single people. The CMHC study, *Regulatory Factors in the Retention and Expansion of Rooming House Stock (2000)* provided information on a number of strategies to stabilize the rooming house stock, which is under constant threat from a variety of forces.

This study looked at other approaches to conserving rooming house and SRO stock and stabilizing tenancies. A range of initiatives was addressed in seven case studies involving:

- conflict reduction;
- public education;
- community development;
- building construction; and
- supportive housing.

*Prepared by The Starr Group Inc. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, December 2001. 93 pages*

NOTE: No. 102 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

### LOGEMENTS PRIVÉS AU QUÉBEC : LA COMPOSITION DU PARC DE LOGEMENTS, LES PROPRIÉTAIRES BAILLEURS ET LES RÉSIDANTS

This study was conducted by the INRS-Urbanisation, Culture et Société for the Société d'habitation du Québec, Canada Mortgage and Housing Corporation, the Régie du logement and the Régie du bâtiment du Québec. The basic information, concerning the characteristics of the Quebec housing stock, its occupants and the ownership of the private rental housing stock, was obtained through a telephone survey conducted by Jolicoeur et associés among renters, homeowners and landlords in the different segments of the Quebec rental housing stock. This survey was conducted from October 5, 2000, to February 12, 2001.

The first stage of the survey was conducted among renters and homeowners, following a stratified sampling plan based on region and tenure. With regard to the regions, the sample was structured so as to obtain significant data for three sets: the Montréal and Québec metropolitan areas and the territory outside the major centres. In this stage of the survey, 10,330 households were polled, including 6,051 homeowner households and 4,279 renter households. The second stage of the survey consisted in reaching a representative sample of landlords. To this end, building owner or manager contact information provided by the renters of private housing was used. In this second stage of the survey, the sample was stratified based on region and building size, and 1,147 interviews were conducted.



## RENTAL HOUSING

The analysis presented examines, in turn, each of the following elements:

- the composition of the housing stock;
- landlords;
- renter households;
- homeowner households; and
- renovations performed by the homeowners.

*Prepared by Francine Dansereau and Marc Choko, with the collaboration of Gérard Divay. Québec: Société d'habitation du Québec, 2002.*

**STATUS :** New Completed Report

**AVAILABILITY :** Centre de documentation de la Société d'habitation du Québec  
Succursale de Québec  
Société d'habitation du Québec  
Tél.: (418) 646-7915  
1-800-463-4315

### NATURAL VACANCY RATES IN CANADIAN URBAN CENTRES, 1992-2001

This study will estimate the 'natural vacancy rate' for each of the major market areas in Canada (Census Metropolitan Areas, or CMAs), spanning the 1998 to 2001 period, and will investigate the extent to which the natural vacancy rates have changed over the period.

**CMHC Project Officer :** Michel Laurence

**CIDN :** 2525 0201007

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### NON-PAYMENT OF RENTS AND THE HEALTH OF THE RENTAL SECTOR IN QUEBEC

This research will measure the extent and spatial distribution of the non-payment of rents in Quebec and its economic impact on the rental sector; identify the socio-economic and demographic factors that could explain the growth of this phenomenon as observed in the number of actions brought by landlords; analyze the regulations governing the processing of recovery-termination cases in view of improving the current procedures at the Régie du logement.

**CMHC Project Officer :** Charles Fortin

**CIDN :** 2305 0200018

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### ONLINE RESIDENTIAL RENTAL GUIDE

This project's objective is to undertake research and produce content for an online residential rental guide. This guide is intended to provide comprehensive advice to tenants, landlords and rental property managers regarding rights, responsibilities and best practices. It will include checklists, worksheets, and sample forms and letters, with guidance as to geographically appropriate variants. It will also provide links to other web sites and contact information.

**CMHC Project Officer :** Ian Melzer

**CIDN :** 2507 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## RENTAL HOUSING

### REPAIR NEEDS ASSESSMENT OF RENTAL HOUSING IN THE CITY OF MISSISSAUGA

The purpose of this project is to carry out a study to examine the state of repair needs of rental buildings in Mississauga.

**CMHC Project Officer :** Greg Goy

**CIDN :** 2524 0600001

**Division :** Market Analysis Centre

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### STRATEGIES TO PRESERVE THE EXISTING RENTAL HOUSING STOCK IN GREATER VANCOUVER

This project's objective is to identify tools and initiatives in the United States that are geared to preserving the existing rental housing stock. These could include policies, programs, legislative or other mechanisms that may be available on a national, provincial, or municipal basis. The researchers also plan to identify initiatives or strategies that provide examples of how various tools have been used. Another approach may be to identify jurisdictions where the rental housing stock is being successfully maintained

**CMHC Project Officer :** Kamal C Gupta

**CIDN :** 2525 0201018

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## RESIDENTIAL DEVELOPMENT

### COMMUNITY DESIGN: AN ANALYSIS OF DENSITY MEANINGS AND DEVELOPMENT OF A DESIGN TOOL

The study will address how Land Use Density (LUD) stipulations can impact and/or interplay with the various other system components of community plan-making, e.g. open space, schools, retail, etc. The project will provide an electronic template or guideline for a web based density visualization methodology by which individuals, groups, community associations, planning design professionals and institutions might engage in constructive dialogue in regards the selection of appropriate built forms for various densities in various planning situations.

**CMHC Project Officer :** Douglas B Pollard

**CIDN :** 1998 0200001

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### DEVELOPMENT LEVIES, FEES, CHARGES, AND TAXES FOR OWNERSHIP AND RENTAL HOUSING - A SURVEY AND COMPARATIVE ANALYSIS

The objective of this research is to identify, tabulate and compare the separate and cumulative costs of the various development charges, levies, fees and other charges associated with various forms and types of homeownership and rental housing. The study is to encompass a total of 30 municipalities including those examined in an earlier 1997 CMHC study. The research is to identify the changes that have occurred in the interim with regard to the development charges, levies and related fees being applied to homeownership in the intervening period and will assess the effect these charges have on new housing prices and new rental property development costs.

## RESIDENTIAL DEVELOPMENT

**CMHC Project Officer :** Fanis Grammenos

**CIDN :** 2752 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### RESIDENTIAL DEVELOPMENT IN COASTAL COMMUNITIES: ADDRESSING CLIMATE CHANGE THROUGH SUSTAINABLE COASTAL PLANNING

The objectives of this project are: to understand the relationship between coastal development, climate change and sea level rise; determine the policy and planning context, and stakeholder understanding of climate change and the impact of sea level rise on coastal residential development, in a local case study; and to recommend new development guidelines for coastal residential development to adapt to climate change and sea level rise.

**CMHC Project Officer :** Brian Eames

**CIDN :** 2437 0200012

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### RESIDENTIAL QUADRANTS: A NEW MODEL FOR SUSTAINABLE SUBURBS

This project's purpose is to 1. Answer the question: would developers and municipalities be interested in building the residential quadrant design concept? 2. Assess the acceptability and attractiveness of the concept and its various components to developers and municipal authorities; and 3. Perform a comparative analysis of the proposed concept, and conventional and new urbanist suburbs to assess how different street patterns affect cost, livability and consumption of land and resources.

**CMHC Project Officer :** Fanis Grammenos

**CIDN :** 2525 0201002

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

## SENIORS

### ÉTUDE DE L'ORIENTATION SPATIALE DANS LES COMPLEXES RÉSIDENTIELS POUR PERSONNES ÂGÉES PRÉSENTANT OU NON DES TROUBLES COGNITIFS

Dementia, with a prevalence of 8% among Canadians aged 65 years and over, diminishes people's ability to find the places where they want to go and consequently limits them on the use of their residential environment. Older people who have dementia are likely to share residential spaces with those who do not, which form the majority. This situation turns out to be problematic with respect to architectural design. The goal of this descriptive and exploratory study is to generate design criteria to facilitate wayfinding for elderly people living in mixed residences, that is, buildings dedicated both to individuals with and without cognitive problems. Qualitative and quantitative data were obtained on the sites of three urban residences that represent variable degrees of socio-economic affluence. They were drawn from interviews with staff and with residents affected by cognitive problems, and from observing the wayfinding behaviors of selected residents. The results emphasize the devastating impacts of impaired wayfinding abilities on the residents' quality of life. The most problematic situations involved searching for one's own apartment and confusion between floors. These raise concerns over the effects of using repetitive floor layouts, and the absence of architectural landmarks and appropriate signage. To be effective, circulation systems must be clear and well organized. Practical interventions with respect to architecture, wayfinding



## SENIORS

information, and human environment are suggested, thereby initiating a reflection on the future of residential environments for older people.

*Prepared by Romedi Passini ... and others. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2002 printing. (External Research Program Research Report) 66 p.*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### EVALUATION OF OPTIMAL BATH GRAB BAR PLACEMENT FOR SENIORS

This project's objective is to assess different locations and configurations of bathtub grab bars and to identify the safest and most useful options to help independent seniors living in their home to maintain their independence and avoid falls.

**CMHC Project Officer :** Luis Rodriguez

**CIDN :** 2305 0200021

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### INTERGENERATIONAL COHABITATION IN QUÉBEC CITY SUBURBS

This research project addresses intergenerational cohabitation in a suburban accessory apartment, which is defined as a self-contained housing unit attached to, or built within, a single-family house and that may share the entrance, backyard and parking area of the house (Leimwand and Despres, 1999: 3-4). The research pursues two objectives. The first involves documenting the family social dynamics that come into play when such an option is put forward. The second is to identify the bearing that municipal zoning by-laws have on the decision and the type of cohabitation.

**CMHC Project Officer :** Luis Rodriguez

**CIDN :** 2525 0201012

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### LEGAL FRAMEWORK FOR SUPPORTIVE HOUSING

This project will review legislation applying to supportive housing for seniors and explore options for reform. The focus will be on legislation in British Columbia. The report resulting from the research should be useful to individuals and organizations involved in the development of supportive housing as well as policy makers.

**CMHC Project Officer :** Luis Rodriguez

**CIDN :** 2525 0201017

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

**\*NEW\***

### LIFE LEASE HOUSING: CONSUMER DREAM OR CONSUMER NIGHTMARE?

The objective of this research is to answer the question: what form of regulation would protect consumers while not overregulating the industry?

**CMHC Project Officer :** Luis Rodriguez

**CIDN :** 2437 0200009

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### LIFE LEASE OWNERSHIP BY THE ELDERLY OF SUITES WITH CONTINUING CARE SERVICES

The objective of this research is to gather and document the views and preferences of prospective elderly residents for two distinct types of accommodation models. One model being a combination of life leases and support services in a home like environment, and the other a traditional long term care facility. The analysis will be done both before and after occupancy.

**CMHC Project Officer :** Luis Rodriguez

**CIDN :** 2437 0200002

**Division :** External Research Program

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### SEMINARS ON SENIORS' HOUSING TO THE RESIDENTIAL CONSTRUCTION AND HEALTH CARE SECTORS

This project's objective is to develop and undertake delivery of seminars on seniors housing to professionals in the Canadian residential and home care sectors. The project was developed to disseminate share the results of CMHC's research, programs and other relevant information concerning seniors housing. options.

Included in this project is the development of eight separate modules on different aspects of seniors housing. By year end 2002 To date, 27 31 seminars/presentations will have been delivered at over 20 events. Preliminary evaluation results indicate a very high degree of satisfaction with the seminars. The seminars project and they will continue in 2002-03 with a focus on the health and home care industry, architects and home builders.

**CMHC Project Officer :** Jim Zamprelli

**CIDN :** 2382 0200002

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### TOGETHER INDEPENDENTLY: A HOUSING CONCEPT TO AID THE COMMUNITY INTEGRATION OF SENIORS AND DISABLED ADULTS = ENSEMBLE MAIS AUTONOMES : UN CONCEPT DE LOGEMENT QUI FAVORISE L'INTÉGRATION DES AÎNÉS ET DES ADULTES HANDICAPÉS DANS LA COLLECTIVITÉ

In Shediac, N.B., Alphonse LeGresley conceived and built a unique house that addressed a genuine Canadian housing need. Unfortunately, the Moncton area civil engineer could not persuade anyone to live in his house.

Mr. LeGresley's concept, called "Together Independently", was a duplex-style dwelling in which the occupants of each half shared certain facilities but would otherwise live as if they occupied self-contained units. They would share a kitchen with two fridges, the metered electrical system, the water and sewer systems, the heating system, and could share a central vacuum system.

The clientele for whom he designed the house were seniors and disabled adults, able to live independently with someone nearby they could call on if they took sick or needed help with chores such as housework or shopping. Basically, his house would be occupied by a primary tenant/owner and another tenant willing to act as a companion and helper to the primary occupant. They would share certain living costs, making this an economical arrangement for both.

The project proceeded in three distinct phases. Mr. LeGresley explained his concept to groups representing seniors and the disabled, got their input and adjusted his design to accommodate needs. He explained his plan to municipal officials and obtained the single dwelling designation he sought because it was key to the project's economic viability. Then he secured financing and built the house.

## SENIORS

He held an open house that attracted considerable local media attention to the model. He advertised the house and promoted it directly to organizations interested in the needs of seniors and disabled persons. There was interest, but no one wanted to buy or rent the house. In late 1998, he decided to cut his losses and convert the dwelling to a true duplex. In early 1999, the make over was done and the two units were available for rent.

This report describes Mr. LeGresley's concept and suggests reasons why it did not succeed. Left unanswered is the question, "Would it work elsewhere or under different circumstances?"

Case study written by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 1999 c.2001. (Affordability and Choice Today ACT Regulatory Reform Project; ACT Case Study) 37 pages

Order number: 62228

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

## SOCIAL HOUSING

### EVALUATION STUDY OF THE SHELTER ENHANCEMENT PROGRAM: SEP

The objective of this project is to complete an evaluation of the Shelter Enhancement Program.

**CMHC Project Officer :** Patricia Streich

**CIDN :** 2258 0500002

**Division :** Audit and Program Evaluation Services

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

## SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

### IMPACT OF HOUSING CHOICES: CONSUMER INFORMATION ON SUSTAINABLE COMMUNITY PLANNING

The purpose of this project is to develop a consumer-oriented information product comparing the impact of various housing choice scenarios, each with different community planning patterns. Users of this web based product will be able to select among ten Canadian cities. In each city, five typical neighbourhood development patterns and locations within the urban context will be described, highlighting issues such as private vehicle use, access to daily destinations and availability of private space.

**CMHC Project Officer :** Susan Fisher

**CIDN :** 2280 0200001

**Division :** Policy and Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available



### IT'S ALL ABOUT HOUSING: SUSTAINABLE, PLANNING PRACTICE, AND HOUSING FORM IN THE OAK RIDGES MORaine

The objective of this project is to examine the legacy of planning policy in the Oak Ridges Moraine (ORM) region. The scope of the research centres on the impact and role of housing on growth and institutional conflict in the Moraine region. The analysis will provide a guide for potential planning actions.

**CMHC Project Officer :** Steve R Jacques

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2525 0201006

**STATUS :** Ongoing

**\*NEW\***

### LANDSCAPE DESIGN AND MAINTENANCE FOR CANADIAN HOMES

The purpose is to develop an updated advisory document on landscape design, construction and maintenance for Canadian homes. CMHC's last advisory document of this nature, entitled Landscape Architectural Design and Maintenance, was published in 1982. While it offers many practical tips and tools which should be emulated, the update will be more oriented toward a consumer audience, place more emphasis on sustainability and build on recent CMHC research in this area. The document will be completed in 2003 and will be of interest to consumers, landscape architects and the landscape industry.

**CMHC Project Officer :** Susan Fisher

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2229 0200001

**STATUS :** Ongoing

### RESIDENTIAL INTENSIFICATION BEST PRACTICES FROM ACROSS CANADA

The contractor will document residential intensification best practices from across Canada. The best practices will include built projects as well as municipal initiatives that encourage residential intensification.

**CMHC Project Officer :** Susan Fisher

**Division :** Policy and Research Division

**AVAILABILITY :** Product is not yet available

**CIDN :** 2559 0200001

**STATUS :** Ongoing

**\*NEW\***

### SETTING PRIORITIES FOR SUSTAINABLE COMMUNITY SOLUTIONS

This project will investigate how urban decision-makers, including mayors, councillors, developers, and community residents can most appropriately set priorities for operational solutions leading toward greater community sustainability. 'Setting priorities' typically means determining which solutions will produce the largest 'bang for the buck' in financial, economic, environmental, social and cultural terms simultaneously. Priority-setting methods can be and are readily applied in relation to current decisions, future planning, and post hoc evaluation.

**CMHC Project Officer :** Douglas B Pollard

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2525 0201004

**STATUS :** Ongoing

**\*NEW\***

### SUSTAINABLE COMMUNITY PLANNING AND DEVELOPMENT: DESIGN CHARRETTE PLANNING GUIDE: FINAL REPORT

Design charrettes are becoming increasingly popular as a way to bring a range of expertise and interests together to collaborate on creating innovative design solutions and embody multiple objectives and mutual interests. They give visual form to ideas and policies and can be used to test and refine planning and development policies and directions. Overall, they are a means to obtain the most creative proposals for addressing the most difficult problems in the least amount of time.

This manual is intended as a guide for those who would like to host or otherwise initiate a design charrette process for sustainable community planning. It is directed particularly at the urban planning context but has application to other planning contexts as well.

The opening chapter begins with an introduction to the concepts and elements of sustainable development and 'sustainable community', and the role of design. Design charrettes and charrette-like events are then explored in more detail in terms of their purposes, usefulness and contribution to policy development and community planning. The chapter is intended to provide foundational information regarding sustainability planning, and guidance for deciding how a design charrette can be useful in your local community.

The next chapter outlines key issues and steps involved in confirming a 'go ahead' for hosting or otherwise becoming involved with a charrette. This section examines the decision-making context, allies and resources, ways of building support and promoting the plan, and getting formal approvals. "Readiness Assessments" help you determine whether or not you are ready to proceed and what to do next in accordance with your answers.

Chapter 3, Pre-Charrette Planning: Roll up Your Sleeves, is focused on the host of tasks to be completed in advance of a charrette. It includes sections on the stakeholder community and communications; consultants and facilitators; advance meetings and options; design issues including detailed discussion on the development of the design brief; design team formation and participant selection; time and timing; venue and facilities; support materials; and additional logistics. Sample schedules, products and lists are provided.

The final chapters focus on the choreography, management and documentation of the charrette itself. Guidance and coaching hints for handling all the products of the charrette along with post-charrette communications and presentations is contained in the final chapter.

*Prepared for Ian Smith, Planning Department, City of Vancouver and Douglas Pollard, Research Division, Canada Mortgage and Housing Corporation by Fiona S. Crofton, Principal, ORCAD Consulting Group Inc. Ottawa: CMHC, November 2001. 130 pages*

NOTE: No. 103 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

**STATUS :** Completed Report and Research Highlight

**AVAILABILITY :** Canadian Housing Information Centre

### SUSTAINABLE INTEGRATION OF INFRASTRUCTURE AND BUILDINGS: A FOLLOW-UP WORKSHOP TO THE SUSTAINABLE BUILDINGS 2000 CONFERENCE

This project's objective was to conduct and report upon a workshop entitled 'Sustainable Integration of Infrastructure and Buildings in Maastricht, The Netherlands. The project developed a report which includes the proceedings of a two day discussion and design exercise where European and Canadian experts explored the potential of green buildings to perform as community infrastructure. The report also includes a brief analysis of where Canadian design expertise in this field might find a market niche in European design markets.

*Proceedings prepared by Sebastian Moffatt, The Sheltair Group. Ottawa: Canada Mortgage and Housing Corporation, 2002. 62 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

### TESTING CONSUMER RECEPTIVITY TO SUSTAINABLE COMMUNITY DESIGN FOR A DEMONSTRATION-BUILD SITE IN OKOTOKS, ALBERTA

This project will test consumer receptivity to the alternative features of a 144-acre demonstration project that adopts sustainable community principles and planning criteria.

**CMHC Project Officer :** Susan Fisher

**CIDN :** 2363 0200001

**Division :** Research Division

**STATUS :** Ongoing

**AVAILABILITY :** Product is not yet available

### THEORY TO PRACTICE: LESSONS LEARNED FROM THE USE OF PERFORMANCE ASSESSMENT MEASURES TO IMPLEMENT SUSTAINABLE COMMUNITIES: FINAL REPORT

This report provides a review of the lessons learned from practitioners engaged in the development and use of performance assessment measures (PAMs) for sustainable community development through the development of case studies. A PAM involves the use of an indicator and target for achieving a certain desired future state of affairs with respect to promoting the features of sustainable community development. The process of developing and utilizing PAMs is fundamentally important in moving from broad sustainable community visions, goals and objectives to the implementation of specific measures that yield progress. PAMs are a tool for operationalizing sustainable development in a manner that reflects local circumstances. PAMs are used for a wide variety of purposes including public education, internal program and policy review and development, staff and political communications, and relations with the development community to name a few. The establishment of PAMs within an overall sustainable community development and reporting process can be challenging and the report points to a number of methods of establishing an effective program.

*Prepared by Steven W. Peck and Ray Tomalty. CMHC Project Officer: Doug Pollard. Ottawa: Canada Mortgage and Housing Corporation, 2002. (External Research Program Research Report) ca. 80 pages*

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre



## WOMEN AND HOUSING

### HOUSING OPTIONS FOR WOMEN LIVING ALONE IN RURAL AREAS: FINAL REPORT

Over the years, there has been an increased awareness that female-led households have different housing needs than those of the traditional nuclear family. However, most studies have concentrated on urban areas and there is very little literature available on the housing requirements of women living rurally. This project's objectives are: to identify the unique housing requirements of women living alone in rural areas, the housing options that would meet these requirements, changes required to planning practices and land use regulations that would allow the housing sector to respond to the unique housing requirements of women living alone while respecting the density issues, environmental issues and other factors essential for the preservation of the rural character of life.

Drawing on a case study of fifty women living in the Boundary District of British Columbia, the report suggests that the existing housing supply does not meet the needs of women living alone. The main issues identified are: affordability problems due to low incomes; a limited numbers of housing choices (basically single dwellings on large acreages); and issues around home and property maintenance.

The majority of women wanted to see more housing options in rural areas than the typical single dwelling on a large acreage. While most women preferred to live in their own private dwelling, they were interested in sharing land or adding a second dwelling on their property to provide additional income or for physical help with farm or rural chores. Zoning by-laws in most rural areas in the Boundary prohibit these housing options as housing density is limited to one dwelling per lot, even in areas where the minimum lot size is twenty-five acres. If women living alone are going to have their housing needs fully met in rural areas, land use regulations must allow a greater range of options to emerge.

*Prepared by Margaret Steele. Ottawa: Canada Mortgage and Housing Corporation, 2002. (External Research Program Research Report) 55 pages*

**STATUS :** New Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## YOUTH AND HOUSING

### HOW TALOYOAK, NUNAVUT TERRITORY CREATED AFFORDABLE HOUSING FOR YOUTH THROUGH FUNDING PARTNERSHIPS AND THE LESSONS LEARNED = COMMENT TALOYOAK, DANS LE TERRITOIRE DU NUNAVUT, A PRODUIT DES LOGEMENTS ABORDABLES POUR LES JEUNES GRÂCE À DES PARTENARIATS DE FINANCEMENT, ET LES LEÇONS QUE LA COLLECTIVITÉ A TIRÉES DE SON EXPÉRIENCE

Unlike most parts of Canada, where housing an aging population is a pressing public issue, the civic administration of the Spence Bay Hamlet of Taloyoak, Nunavut Territory, is concerned with the housing needs of youth. In 1996, 42 per cent of the population was aged 14 and under, compared to 13 per cent aged 45 and over. A lack of suitable housing for young adults forces many working youth to live with their parents or grandparents in overcrowded conditions.

To meet the housing needs of youth, the municipality built a 12-unit housing project on land its development corporation leased from the municipality. The project can serve as a model which other northern communities facing similar problems could emulate. The \$7,000 awarded to the Hamlet under the A.C.T. program helped document and promote the project for the benefit of other northern communities. This A.C.T. report is particularly instructive in its description of the

## YOUTH AND HOUSING

funding sources Taloyoak tapped to pay for it all and the various difficulties encountered along the way.

Case study written by Louis Primeau, Hamlet of Taloyoak, Nunavut Territory. Edited by Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: FCM; CHBA; CHRA; CMHC, 2001. (Affordability and Choice Today ACT Case Study) 28 pages

Order number: 62328

**STATUS :** Completed Report

**AVAILABILITY :** CMHC Information Products

## LOGEMENT INNOVATEUR POUR JEUNES PERSONNES SANS ABRI : RAPPORT FINAL

This research is aimed at identifying innovative housing projects intended to meet the needs of homeless youth and the factors that make them exemplary projects, based on two main sources of information – a review of the literature and interviews with key people working in this sector.

The needs of homeless youth documented in the literature are extensive and complex. There are often major deficiencies in terms of training and preparation for the job market; emotional and relationship problems frequently result from a difficult life; and surviving as a homeless person may have led to health and substance abuse problems. In addition, it would seem that these youth often have mental health problems.

Recent studies highlight the determining role of housing as a solution to the problems of homelessness. However, while a stable home may be very important, it is clear that, for certain subgroups including youth, support services are necessary. An analysis of effective models for youth reveals the following elements: a safe and affordable home, constant emotional support, a relationship with at least one responsible and trustworthy adult, the opportunity to develop life skills leading to autonomy, and access to services such as training, education, an employment readiness course, and health care including mental health. The studies also show the need for social ties. Participation and control issues were often raised. Examples of projects that encourage participation in project design were collected.

Prepared by Luba Serge. Ottawa: Canada Mortgage and Housing Corporation, 2002. (CMHC External Research Program Report) 57 pages

**STATUS :** Completed Report

**AVAILABILITY :** Canadian Housing Information Centre

## RESIDENTIAL INTEGRATION OF YOUNG MIGRANTS IN QUEBEC

This study concerns the residential integration process of young migrants in Quebec. Residential integration is defined as a process that begins even before young people leave their parents' home and that continues until they are relatively stable in a dwelling; this stability often, but not necessarily, corresponds to the formation of a family unit.

**CMHC Project Officer :** Leanne Elliott

**Division :** External Research Program

**AVAILABILITY :** Product is not yet available

**CIDN :** 2305 0200005

**STATUS :** Ongoing





- Adjustable Rate Mortgages / Prêts hypothécaires à taux flottant  
(Rev. 18p., October/octobre 1991)
- Children in the urban environment / Les enfants dans le milieu urbain  
(23 p., January/janvier 1993)
- CMHC Scholarship Program: A Bibliography 1947 - 1993 / Le Programme de bourses d'études de la SCHL : une bibliographie 1947 - 1993  
(66 p., 1994)
- Cohousing / Habitation communautaire  
(8p., July/juillet 1996)
- Congregate housing / Habitat collectif  
(10 p., November/novembre 1991)
- Construction industry in Canada / Industrie de la construction au Canada  
(Rev. 27 p., January/janvier 1988)
- Cooperative housing / Coopératives de logements  
(Rev. 40 p., September/septembre 1988)
- Crime prevention and architectural design / Design architectural et prévention de la criminalité  
(7 p., May/mai 1989)
- Crime prevention and urban safety in residential environments / La prévention du crime et la sécurité dans les milieux résidentiels urbains  
(12p., September/septembre 1989)
- Discrimination and segregation in housing in Canada / Bibliographie sur la discrimination et la ségrégation dans le logement au Canada  
(5p., March/mars 1993)
- Downtown redevelopment / Réaménagement de centres-villes  
(Rev. 26p., January/janvier 1989)
- Earthquakes and construction / Tremblements de terre et construction  
(20 p., March/mars 1995)
- External Research Program Reports arranged by subject / Rapports du programme de recherche à l'extérieur par sujet  
(Rev. 70 p., November/novembre 2001)
- Floating Homes and Houseboats / Maisons-bateaux et Bateaux-maisons  
(15 p., August/août 1997)
- Foundations / Fondations  
(17p., January/janvier 1989)
- Graduated payment mortgages / Prêts hypothécaires à paiements progressifs  
(Rev.3p., October/octobre 1991)
- Home equity conversion / Conversion de la valeur nette du logement  
(9p., October/octobre 1988)
- Home ownership / La propriété d'un logement  
(Rev. 28p., August/août 1987)
- Homelessness / Sans-logis  
(Rev. 61 p., June/juin 1998)
- Housing and AIDS / Hébergement des personnes atteintes du SIDA  
(5 p., September/septembre 1993)

## BIBLIOGRAPHIES

- Housing and services for the disabled / Logement et les services pour les handicapés  
(Rev. 68 p., April/avril 1992)
- Housing conversion and residential intensification / Conversion d'habitations et intensification résidentielle  
(Rev. 8 p., October/octobre 1990)
- Housing demand / La demande en logement  
(22 p., November/novembre 1986)
- Housing for immigrants and minorities / Logement pour les groupes ethniques et immigrants  
(7 p., May/mai 1993)
- Housing for single people / Le logement et les personnes seules  
(7 p., October/octobre 1992)
- Housing in Canadian municipalities / Logement dans les municipalités canadiennes  
(Rev. 44 p., March/mars 1985)
- Housing in urban core areas / Logement dans les centres-villes  
(Rev. 13 p., January/janvier 1985)
- Housing management / Gestion des logements  
(Rev. 23 p., January/janvier 1989)
- Housing markets / Le marché du logement  
(Rev. 36 p., January/janvier 1988)
- Housing policy in Canada / Politique du logement au Canada  
(Rev. 45 p., January/janvier 1987)
- Housing quality / Qualité de logement  
(8 p., January/janvier 1988)
- Housing renovation / Restauration de quartiers résidentiels  
(Rev. 62 p., March/mars 1988)
- Housing subsidies / Subventions au logement  
(Rev. 49 p., October/octobre 1990)
- Impact of inflation on house prices / Effets de l'inflation sur le prix des maisons  
(Rev. 5 p., February/février 1995)
- Indoor air pollution / Pollution de l'air des habitations  
(Rev. 29 p., July/juillet 1990)
- Infill housing / Logement résidentiel complémentaire  
(Rev. 8 p., March/mars 1990)
- Insulation / Isolement  
(Rev. 33 p., November/novembre 1991)
- Land banks and land trusts / Banques agraires et sociétés foncières  
(15 p., November/novembre 1990)
- Life cycle costing / Estimations du coût global  
(Rev. 9 p., November/novembre 1992)
- Lofts / Lofts  
(6 p., July/juillet 1996)
- Log structures / Constructions en pièce sur pièce  
(Rev. 8 p., April/avril 1989)

## BIBLIOGRAPHIES

- Low cost affordable housing / Habitation à coût modique  
(Rev. 35 p., October/octobre 1989)
- Manufactured housing / Habitation préfabriquée  
(Rev. 33 p., November/novembre 1986)
- Moisture problems in buildings / Humidité dans les constructions  
(Rev. 21 p., July/juillet 1990)
- Mortgage-backed securities / Titres hypothécaires  
(13 p., March/mars 1988)
- Mortgage insurance / L'assurance hypothécaire  
(11 p., April/avril 1988)
- Mortgages / Hypothèques  
(Rev. 21 p., August/août 1984)
- \*Native housing / Logement pour autochtones  
(Rev. 51 p., October/octobre 2002)
- Noise / Le bruit  
(30 p., December/décembre 1991)
- Non-profit housing / Le logement à but non-lucratif  
(Rev. 19 p., October/octobre 1989)
- \*The North / Le nord  
(31 p., November/novembre 2002)
- Playgrounds / Terrains de jeux  
(Rev. 30 p., December/décembre 1991)
- Post occupancy evaluation / Évaluation après occupation  
(13 p., February/février 1989)
- Public housing in Canada / Habitations à loyer modéré au Canada  
(Rev. 63p., September/septembre 1991)
- Public housing in Great Britain / Habitations à loyer modéré au Grande-Bretagne  
(17p., September/septembre 1988)
- Public/Private Partnerships / Association du secteur public et du secteur privé  
(13 p., December/décembre 1989)
- Radon and houses / Radon dans les habitations  
(Rev. 23 p., July/juillet 1990)
- Real estate in Canada / Propriété immobilière au Canada  
(Rev. 37 p., September/septembre 1987)
- Rent control / Contrôle des loyers  
(Rev. 20 p., August/août 1990)
- Rental housing / Logement locatif  
(111 p., September/septembre 2000)
- Residential development / Développement résidentiel  
(Rev. 57 p., July/juillet 1991)
- Residential displacement, relocation, and gentrification / Relogement, relocalisation, et embourgeoisement  
(19 p., September/septembre 1988)



## BIBLIOGRAPHIES

- Residential Rehabilitation Assistance Program / Programme d'aide à la remise en état des logements  
(8 p., February/février 1988)
- Resource communities / Villes d'exploitation de ressources  
(Rev. 15 p., March/mars 1988)
- Retirement and life care communities / Collectivités de retraités et communautés fournissant des soins à vie  
(Rev. 10 p., March/mars 1990)
- Rural housing / Logement rural  
(Rev. 18 p., March/mars 1988)
- Secondary mortgage markets / Marchés hypothécaires secondaires  
(6 p., August/août 1982)
- Self-help housing / Autoconstruction  
(Rev. 13 p., January/janvier 1989)
- Seniors housing / Le logement et les personnes âgées  
(Rev. 146 p., October/octobre 2000)
- Shared housing / Logement à contrepartie de travaux  
(Rev. 11 p., October/octobre 1994)
- Solar access rights / Droit au soleil  
(Rev. 8 p., October/octobre 1992)
- Solar heating / Chauffage solaire  
(Rev. 16 p., October/octobre 1992)
- Solar houses / Maisons solaires  
(Rev. 22 p., October/octobre 1992)
- Stackwall and cordwood house construction / Construction de maisons de «bois cordé»  
(Rev. 2 p., December/décembre 1992)
- Straw bale housing / Maisons de ballots de paille et mortier  
(Rev. 14 p., December/décembre 2001)
- Student housing / Logement pour les étudiants  
(Rev. 6 p., July/juillet 1989)
- Temporary shelter for battered women / L'hébergement temporaire pour les femmes victimes de violence  
(Rev. 11 p., May/mai 1991)
- Total Quality Management/Qualité totale  
(17p., July/juillet 1996)
- Underground housing / Maisons souterraines  
(Rev. 31 p., October/octobre 1992)
- Urban Infrastructure in Canada / L'infrastructure urbaine au Canada  
(62 p., April/avril 1989)
- Vacation homes / Chalets  
(29 p., November/novembre 1991)
- Variable-rate mortgages / Les prêts hypothécaires à taux variable  
(Rev. 9p., October/octobre 1991)

## BIBLIOGRAPHIES

Ventilation / Ventilation

(Rev. 26 p., September/septembre 1991)

Wind pressure and buildings / Les pressions exercées par le vent sur les bâtiments

(Rev. 13 p., November/novembre 1990)

Women and housing / Les femmes et le logement

(15 p., April/avril 1991)

Wood construction / Construction en bois

(Rev. 21 p., August/août 1987)

Youth and Housing / Les jeunes et le logement

(20 p., November/novembre 1998)

## TITLE INDEX

- 2001 COOPERATIVE HOUSING SURVEY, 66
- ABORIGINAL HOUSING: LOCAL DESIGN AND MATERIAL, 7
- ACHIEVING HEALTHY INDOOR ENVIRONMENTS: A REVIEW OF CANADIAN OPTIONS, 41
- ACT REGIONAL STAKEHOLDER INFORMATION SESSIONS, 76
- ADAPTATION OF POTENTIAL HOUSING DEMAND MODEL TO ABORIGINAL COMMUNITIES - AN EXAMPLE, 61
- AFFORDABLE HOUSING ADVISOR, 76
- AFFORDABLE HOUSING COMPONENT OF CMHC'S WEB SITE, 76
- AFFORDABLE HOUSING IN VANCOUVER FOR PEOPLE LIVING WITH HIV/AIDS = DES LOGEMENTS ABORDABLES À VANCOUVER POUR LES PERSONNES VIVANT AVEC LE VIH/SIDA, 76
- ALTERNATE ABORIGINAL TRAINING DELIVERY OPTIONS, 61
- ALTERNATIVE HOME ENERGY SOURCES FOR THE NORTH, 15
- ALTERNATIVE WALL SYSTEMS FOR LOW-RISE RESIDENTIAL CONSTRUCTION, 35
- ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS, 16
- ANALYTICAL MODEL OF EARTH TUBE VENTILATION SYSTEMS, 21
- APPLICABILITY OF A CONTINUUM OF CARE MODEL TO ADDRESS HOMELESSNESS, 69
- ASSESSING THE PARAMETERS FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS, 21
- ASSESSMENT REPORT ON RENTAL HOUSING TAXATION IN CANADA, 89
- AT HOME IN A COMMUNITY, 69
- BEST PRACTICE GUIDE - FIRE AND SOUND ASSEMBLIES FOR MULTI-FAMILY BUILDINGS, 27
- BEST PRACTICE GUIDE - WOOD FRAME ENVELOPES IN COASTAL CLIMATES OF BRITISH COLUMBIA, 27
- BEST PRACTICE GUIDE FOR CURTAIN WALLS, 28
- BEST PRACTICE GUIDE FOR EXTERIOR INSULATED FINISHED SYSTEMS (EIFS), 28
- BEST PRACTICE GUIDE FOR PRE-CAST CONCRETE WALLS, 13
- BONHEUR DU BON AIR - ALONG WITH THE DRAFTING OF AN ACCOMPANYING BOOKLET, 41
- BUILDING ENVELOPE SOLUTIONS - THEORY AND PRACTICE, 35
- BUILDING ENVELOPE TEST HUT FACILITY PHASE 2 FEASIBILITY STUDY, 28
- BUILDING RATING AND LABELING SYSTEMS, 28
- BUYING A TOILET. ABOUT YOUR HOUSE; CE 39, 56
- CAN/CSA F326-M91 (R1998), RESIDENTIAL MECHANICAL VENTILATION SYSTEMS, 22



## TITLE INDEX

- CANADA'S CONSTRUCTION SYSTEM. ABOUT YOUR HOUSE; CE42, 36
- CANADIAN BUILDING PRODUCT DISTRIBUTION CENTRE IN SOUTHERN CHINA, 79
- CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS NATIONAL INITIATIVE - PHASE II, 53
- CANADIAN HOUSING EXPORTERS IN THE KOREAN HOUSING MARKET, 79
- CANADIAN HOUSING FIRE STATISTICS, 20
- CASE STUDIES OF MAJOR HOME ENERGY RETROFITS, 16
- CASE STUDIES OF WATER CONSERVATION INITIATIVES IN MULTIS, 57
- CAUSES AND CONDITIONS CONTRIBUTING TO FAMILY HOMELESSNESS AND APPROACHES TO ADDRESSING FAMILY HOMELESSNESS, 70
- CEMENT SKIN EPS CORE BUILDING SYSTEM: PROOF OF CONCEPT TESTING - PRELIMINARY STRUCTURAL EVALUATION, 11
- CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS, 22
- CHARACTERIZATION OF ENERGY AND WATER END-USE LOAD PROFILES IN HOUSING: LITERATURE REVIEW, 16
- CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA, 29
- CHARACTERIZE THE PERFORMANCE OF A WATER LOOP HEAT PUMP SYSTEM IN A MULTI-UNIT RESIDENTIAL BUILDING, 22
- CLEANING UP YOUR HOUSE AFTER A FIRE, 20
- CLEANING UP YOUR HOUSE AFTER A FLOOD AND CLEAN-UP PROCEDURES FOR MOLD IN HOUSES, 45
- COMMUNICATIONS & INFORMATION TRANSFER STRATEGY FOR ABORIGINAL GROUPS, 61
- COMMUNITY DESIGN: AN ANALYSIS OF DENSITY MEANINGS AND DEVELOPMENT OF A DESIGN TOOL, 92
- COMPARING THE PERFORMANCE OF TWO-COAT VS THREE-COAT STUCCO, 36
- COMPARISON OF NORTHERN HOUSING COSTS, 48
- COMPLIANCE OF VENTILATION SYSTEMS INSTALLED TO MEET THE JUNE 18, 2001 DRAFT OF SECTION 9.32: FOR THE NBCC : FINAL REPORT, 23
- COMPOSITE MASONRY WALL TIES: FINAL REPORT, 12
- COMPREHENSIVE STUDY ON SLAB-ON-GRADE FOUNDATIONS, 10
- CONCEPT OF A QUALITY LOCATION AND THE CENTRAL DISTRICTS OF MONTRÉAL, 65
- CONDITION SURVEY OF CONDOMINIUMS IN THE GREATER TORONTO AREA (GTA), 29
- CONDOMINIUM BUYER'S GUIDE, 35
- CONSERVATION CO-OP CORRIDOR OVERHEATING REMEDIATION STUDY, 23
- CONTINUATION OF NORTHERN VENTILATION STUDY, 49

## TITLE INDEX

- CONTRACT MANAGEMENT COURSE FOR RESIDENTIAL PROPERTY MANAGERS AND BUILDING OWNERS, 52
- CONTRIBUTION TO A STUDY ON PACIFIC RIM MARKETS FOR TERMITE-RESISTANT WOOD PRODUCTS, 80
- COOPERATIVE HOUSING PROJECTS IN DIFFICULTY, 66
- COST OF CO-OPERATIVE HOUSING, 67
- DEFINING PERFORMANCE OF WATER RESISTIVE BARRIERS, 45
- DEMONSTRATION OF HEALTHY HOUSING ON RESERVE, 7
- DESIGN MULTIPLE-UNIT CHUM'S AND MODULAR HOUSE PACKAGES FOR URBAN AND SUBURBAN, REMOTE AND NORTHERN COMMUNITIES, 39
- DETERMINING THE EFFORT NEEDED BY ADULTS AND SENIORS TO CLIMB RAMPS USING MANUAL WHEEL-CHAIRS, 85
- DEVELOPMENT LEVIES, FEES, CHARGES, AND TAXES FOR OWNERSHIP AND RENTAL HOUSING - A SURVEY AND COMPARATIVE ANALYSIS, 92
- DEVELOPMENT OF A GUIDE TO THE UNITED KINGDOM BUILDING REGULATIONS, 80
- DEVELOPMENT OF A RESEARCH FRAMEWORK FOR POPULATION HEALTH AND HOUSING, 86
- DEVELOPMENT OF AN EXPORT TOOL-KIT FOR CHINA, 80
- DEVELOPMENT OF AN INSTRUCTOR'S GUIDE AND AN ACCOMPANYING PRESENTATION FOR RESIDENTIAL GUIDE TO EARTHQUAKE RESISTANCE, 36
- DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR), 29
- DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR) TASK 2: COLLECTION OF ADDITIONAL BUILDING FILES FOR THE HISTAR DATABASE, 30
- DEVELOPMENT OF TRANSITION TRAINING FOR OBJECTIVE-BASED CODES, 11
- DIRECTED RESEARCH EVALUATION REPORT, 84
- DISCLOSURE REQUIREMENTS IN MORTGAGE LENDING AND SUPPORT TO BORROWERS IN OBTAINING THE BEST MORTGAGE TERMS, 85
- DISINVESTMENT AND THE DECLINE OF URBAN NEIGHBORHOODS, 73
- DUAL FLUSH TOILET PILOT PROJECT, 57
- ECO-ASSESSMENT TOOL FOR PROPERTY MANAGERS OF MULTIPLE UNIT RESIDENTIAL BUILDINGS (MURBS), 52
- ECONOMIC FEASIBILITY STUDY OF WATER REUSE AND TREATMENT TECHNOLOGIES, 57
- EFFECTS OF URBAN ABORIGINAL RESIDENTIAL MOBILITY AND SERVICE PROVISION, 62
- ELECTRIC BASEBOARD RETROFIT IN MULTI-FAMILY BUILDINGS, 24
- ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS, 17
- ENERGY EFFICIENCY OPPORTUNITIES MANUAL FOR MULTI-UNIT RESIDENTIAL BUILDINGS, 17

## TITLE INDEX

- ENERGY USE OF STRAW BALE BUILDINGS WITH COMPARABLE BUILDINGS OF CONVENTIONAL CONSTRUCTION, 18
- ENHANCING THE APPLICABILITY AND USEFULNESS OF CMHC'S HOMEOWNER'S MANUAL FOR NEW HOMES, 69
- ENVIRONMENTAL SCAN OF HOUSING SECTOR GIS PRACTICES, 74
- ESTIMATION OF CORE HOUSING NEED USING THE SURVEY OF HOUSEHOLD SPENDING MICROFILE, 83
- ETHICAL AND SOCIAL FUND INVESTMENTS IN LOWER-TO-MODERATE INCOME AFFORDABLE RENTAL HOUSING IN CANADA: AN ASSESSMENT, 89
- ETHNIC CHANGES AND THE HOUSING MARKET IN RIVIÈRE-DES-PRAIRIES, MONTRÉAL, 73
- ÉTUDE DE L'ORIENTATION SPATIALE DANS LES COMPLEXES RÉSIDENTIELS POUR PERSONNES ÂGÉES PRÉSENTANT OU NON DES TROUBLES COGNITIFS, 93
- EVALUATING HOUSING STABILITY FOR PEOPLE WITH SERIOUS MENTAL ILLNESS AT RISK FOR HOMELESSNESS: FINAL REPORT, 70
- EVALUATION OF AN APARTMENT HEAT RECOVERY VENTILATION SYSTEM, 24
- EVALUATION OF COOPERATIVE HOUSING, 67
- EVALUATION OF HOUSING TAXATION MEASURES, 78
- EVALUATION OF OPTIMAL BATH GRAB BAR PLACEMENT FOR SENIORS, 94
- EVALUATION STUDY OF THE SHELTER ENHANCEMENT PROGRAM: SEP, 96
- EVOLVING IMPACT OF E-COMMERCE ON HOUSING FINANCE ACCESS AND AFFORDABILITY: US EXPERIENCE AND LESSONS FOR CANADA, 85
- EXAMINING INUIT SPACE USE IN EURO-CANADIAN HOUSE FORMS, 62
- EXAMINING THE HOUSING CHOICES OF INDIVIDUALS WITH DISABILITIES, 86
- EXPERIENCE OF EARLY ADOPTORS OF SMALL SCALE, GRID-CONNECTED RENEWABLE ENERGY SOURCE POWER PRODUCTION AND NET METERING POLICIES IN CANADA, 18
- FEASIBILITY OF DEVELOPING A BUILDING CANADA PROGRAM, 37
- FEASIBILITY OF UTILIZING A PORTABLE HOUSING PLANT FOR SINGLE FAMILY DETACHED CONSTRUCTION, 44
- FEASIBILITY STUDY ON THE DEVELOPMENT OF A COMMISSIONING GUIDE FOR NEW HOUSES, 37
- FIRE AND ACOUSTICAL PERFORMANCE OF FLOOR ASSEMBLIES - PHASE II, 30
- FIRST NATIONS HEALTHY HOUSING SUSTAINABLE COMMUNITY DEVELOPMENT SYMPOSIUM, AND UPDATE OF THE 'BEST PRACTICES' PUBLICATION, 8
- FIRST NATIONS HOUSING PROPERTY MANAGEMENT TRAINING COURSES AND RESOURCES, 62
- FLEXHOUSING FEATURES COST COMPARISONS - IN A BENCHMARK HOUSE DESIGN, 39
- GOVERNANCE IN LOCAL PARTNERSHIPS TO ADDRESS HOMELESSNESS, 71



## TITLE INDEX

- GUIDE TO THE RULES UNDER THE NORTH AMERICAN FREE TRADE AGREEMENT AND U.S. IMMIGRATION LAW FOR CANADIAN COMPANIES IN THE HOUSING, RENOVATION AND RESIDENTIAL CONSTRUCTION SECTOR, 80
- GUIDELINES FOR MOISTURE MANAGEMENT IN EXTERIOR WALL SYSTEMS, 46
- GUIDELINES FOR ON-SITE MEASUREMENT OF MOISTURE IN WOOD BUILDING MATERIALS, 46
- GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS, 30
- HEALTHY HIGH-RISE : A GUIDE TO INNOVATION IN THE DESIGN AND CONSTRUCTION OF HIGH-RISE RESIDENTIAL BUILDINGS, 31
- HEALTHY HOUSING IN THE NORTH: TOWARDS A NORTHERN HEALTHY HOUSE DEMONSTRATION PROJECT, 49
- HEALTHY INDOORS: ACHIEVING HEALTHY INDOOR ENVIRONMENTS IN CANADA, 42
- HIRING A HOME INSPECTOR. ABOUT YOUR HOUSE; CE35, 53
- HISTORY OF CANADA'S RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP), 88
- HOMEOWNER'S INSPECTION CHECKLIST, 54
- HOUSING DISCRIMINATION IN CANADA: THE STATE OF KNOWLEDGE, 68
- HOUSING FORM AND QUALITY IN RELATION TO CHILDREN'S MENTAL HEALTH, 64
- HOUSING MARKET GUIDES ON FOUR CITIES IN THE UNITED STATES, 81
- HOUSING MARKET RESEARCH: OPPORTUNITIES FOR CANADIAN TRAINING PROGRAMS IN CHINA, 81
- HOUSING NEEDS OF LOW-INCOME PEOPLE LIVING IN RURAL AREAS, 74
- HOUSING OPTIONS FOR WOMEN LIVING ALONE IN RURAL AREAS: FINAL REPORT, 100
- HOUSING STABILITY INDICATORS AND IMPACTS, 90
- HOW TALOYOAK, NUNAVUT TERRITORY CREATED AFFORDABLE HOUSING FOR YOUTH THROUGH FUNDING PARTNERSHIPS AND THE LESSONS LEARNED = COMMENT TALOYOAK, DANS LE TERRITOIRE DU NUNAVUT, A PRODUIT DES LOGEMENTS ABORDABLES POUR LES JEUNES GRÂCE À DES PARTENARIATS DE FINANCEMENT, ET LES LEÇONS QUE LA COLLECTIVITÉ A TIRÉES DE SON EXPÉRIENCE, 100
- HYGROTHERMAL MODELLING OF THE INTERIOR INSULATION RETROFIT OF A SOLID MASONRY BUILDING, 18
- IDENTIFICATION OF FUTURE OPTIONS FOR THE LEBRETON FLATS DISTRICT HEATING SYSTEM, 24
- IDENTIFICATION OF KNOWLEDGE GAPS IN DISASTER INFORMATION FOR HOUSEHOLDERS IN CANADA: FINAL REPORT, 74
- IMPACT OF CONVERSIONS OF RENTAL TO OWNERSHIP UNITS ON HOUSING MARKETS IN ONTARIO, 83
- IMPACT OF HOUSING CHOICES: CONSUMER INFORMATION ON SUSTAINABLE COMMUNITY PLANNING, 96
- IMPACT OF THE HOME BUYERS' PLAN ON THE DECISION TO BUY A HOME, 69
- IMPROVEMENTS TO THE MOISTURE PERFORMANCE OF PRESERVED WOOD FOUNDATIONS, 46

## TITLE INDEX

- INDOOR AIR POLLUTION FROM ATTACHED GARAGES, 42
- INDUSTRY PROFILE OF CANADIAN LIGHT STEEL BUILDING, 72
- IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL ASSEMBLIES - COQUITLAM, BC, 47
- IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL SYSTEMS - VANCOUVER, BC, 47
- INSULATED CONCRETE FORMS TRAINING PROGRAM, 10
- INTERGENERATIONAL COHABITATION IN QUÉBEC CITY SUBURBS, 94
- INTERGENERATIONAL HOUSING TRENDS AND CHALLENGES, 74
- INTERVENTIONS FOR ROOMING HOUSES, SROS AND TENANTS: FINAL REPORT, 90
- INVESTIGATING AND DOCUMENTING FIRST NATION TECH SERVICES INSTITUTES, 63
- INVESTIGATION OF ACCELERATED DOMESTIC OIL TANK CORROSION, 14
- INVESTIGATION OF SMOKE CONTROL IN HIGH-RISES BY POSITIVE PRESSURE VENTILATION, 21
- INVESTIGATION PROTOCOL FOR EVALUATION OF POST-TENSIONED BUILDINGS, 31
- INVESTOR CONDOMINIUM MARKET IN VANCOUVER, BURNABY, AND RICHMOND, 83
- INVOLVING HOMELESS AND FORMERLY HOMELESS CLIENTS IN PROJECTS AND PROGRAMS TO ADDRESS HOMELESSNESS: FINAL REPORT, 71
- ISSUES PAPER ON LIABILITY IN HOUSE CONSTRUCTION, 66
- IT'S ALL ABOUT HOUSING: SUSTAINABLE, PLANNING PRACTICE, AND HOUSING FORM IN THE OAK RIDGES MORAINÉ, 97
- JAPANESE CONSUMERS BASED ON NINE PERFORMANCE INDICATORS, 81
- LANDSCAPE DESIGN AND MAINTENANCE FOR CANADIAN HOMES, 97
- LEAK-PROOFING WINDOWS, PHASE I - FABRICATION, INSTALLATION AND MAINTENANCE, 14
- LEAK-PROOFING WINDOWS, PHASE II - A REVIEW OF STANDARDS TESTING AND CERTIFICATION, 15
- LEGAL FRAMEWORK FOR SUPPORTIVE HOUSING, 94
- LIFE LEASE HOUSING: CONSUMER DREAM OR CONSUMER NIGHTMARE?, 94
- LIFE LEASE OWNERSHIP BY THE ELDERLY OF SUITES WITH CONTINUING CARE SERVICES, 95
- LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING, 32
- LOGEMENT INNOVATEUR POUR JEUNES PERSONNES SANS ABRI : RAPPORT FINAL, 101
- LOGEMENTS PRIVÉS AU QUÉBEC : LA COMPOSITION DU PARC DE LOGEMENTS, LES PROPRIÉTAIRES BAILLEURS ET LES RÉSIDANTS, 90
- MAJOR MAINTENANCE AND RESIDENTIAL RENOVATION: A SURVEY OF MEANS TO IMPROVE THE ARCHITECTURAL ACCESSIBILITY OF EXISTING BUILDINGS, 86
- MANDATORY HOME INSPECTIONS ON RESALE HOMES IN ONTARIO, 54

## TITLE INDEX

- MANUFACTURED HOME DESIGN AND LAND LEASE COMMUNITY PLANNING, 44
- MANUFACTURED HOUSING CONSULTANTS' TRAINING PROGRAM - PHASE II, 45
- MATERIAL PROPERTIES OF STRAW LIGHT CLAY INFILL SYSTEMS, 12
- MAXIMUM DAY WATERING DEMAND PHASE II - ASSESSMENT OF WATER CONSERVATION STRATEGIES, 57
- MEASURING RESIDENTIAL MOBILITY OF URBAN ABORIGINAL PEOPLE, 63
- MERGE THE EXISTING NATIONAL AND PROVINCIAL ASSOCIATIONS INTO ONE NEW NATIONAL ENTITY TO REPRESENT THE PRIVATE HOME AND PROPERTY INSPECTION INDUSTRY ACROSS THE COUNTRY, 54
- METROPOLIS CENTRES OF EXCELLENCE FOR RESEARCH ON IMMIGRATION ISSUES, 77
- MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS, 32
- MODIFY AND UPGRADE WALLDRY COMPUTER PROGRAM, 48
- MOLD CLEANUP PROCEDURES: CONTRACTORS' GUIDE, 48
- MONITORING INNOVATIVE MECHANICAL AND ELECTRICAL SYSTEMS, 32
- MONTREAL: A RICH TRADITION IN MEDIUM-DENSITY HOUSING, 40
- NATIONAL CONSULTATION TO EVALUATE HOME\$AVE: AN ASSET-BASED APPROACH TO ANTIPOVERTY USING HOUSING AS A CATALYST, 75
- NATIVE INSPECTION SERVICES INITIATIVE (NISI) GUIDE, 8
- NATURAL VACANCY RATES IN CANADIAN URBAN CENTRES, 1992-2001, 91
- NOISE ISOLATION PROVIDED BY GYPSUM BOARD PARTITIONS, 9
- NON-PAYMENT OF RENTS AND THE HEALTH OF THE RENTAL SECTOR IN QUEBEC, 91
- NORTH WEB-SITE, 50
- NORTHERN HEALTHY MIXED-USE BUILDING DEMONSTRATION, 50
- NORTHERN HEATING AND VENTILATION SYSTEMS, 25
- NORTHERN LANDSCAPING: A GUIDE TO RESTORING THE PLANTS AND SOIL IN NORTHERN COMMUNITIES, 50
- ONLINE RESIDENTIAL RENTAL GUIDE, 91
- ON-RESERVE COMPONENT OF THE RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP PHASE III), 64
- OPPORTUNITIES FOR IMPROVING THE INSPECTIONS PROCESS, CITY OF VANCOUVER, BRITISH COLUMBIA = OCCASIONS D'AMÉLIORER LE PROCESSUS D'INSPECTION, VILLE DE VANCOUVER (COLOMBIE-BRITANNIQUE), 87
- OPTIMIZING HEAT AND AIR DISTRIBUTION SYSTEMS WHEN RETROFITTING HOUSES FOR ENERGY EFFICIENCY, 18



## TITLE INDEX

- PERFORMANCE ASSESSMENT OF LOW FLOW TOILETS, 58
- PERFORMANCE ASSESSMENT OF THE LEBRETON FLATS DISTRICT HEATING SYSTEM, OTTAWA, ONTARIO, CANADA, 25
- PERFORMANCE OF AN INNOVATIVE HIGH-RISE RESIDENTIAL BUILDING, 33
- POSITIVE PRESSURE VENTILATION FOR HIGH-RISE BUILDINGS, 25
- POTENTIAL ELEMENTS OF A HUMAN RESOURCES DEVELOPMENT STRATEGY FOR THE RESIDENTIAL CONSTRUCTION INDUSTRY, 72
- POUSSIÈRE DOMESTIQUE : UN OUTIL EFFICACE ET ABORDABLE D'ÉVALUATION DE SALUBRITÉ MICROBIENNE RÉSIDENTIELLE : RAPPORT FINAL, 43
- PRACTICAL MEASURES FOR THE PREVENTION OF BASEMENT FLOODING DUE TO MUNICIPAL SEWER SURCHARGE, 11
- PREFABRICATED HOUSING IN SWEDEN AND FINLAND, 81
- PRINCE EDWARD ISLAND BIRTH COHORT STUDY OF MOLD IN HOMES, 43
- PRODUCTIVITY TRENDS IN THE CONSTRUCTION SECTOR IN CANADA: A CASE OF LAGGING TECHNICAL PROGRESS, 72
- PUBLIC HOUSING TENANT SELF-MANAGEMENT: AN EVALUATION OF THE ALEXANDRA PARK CO-OP CONVERSION PROCESS IN TORONTO, 67
- QUALIFICATION OF THE DEGREE OF ACOUSTIC COMFORT PROCURED BY MULTI-FAMILY BUILDINGS - PHASE II, 10
- QUANTIFYING UNIVERSAL DESIGN: A PROGRAM FOR IMPLEMENTATION, 40
- RECYCLE: LIFECYCLE - HOW TO RENOVATE A HOME FOR CHANGE, 55
- REDUCTION OF AIR INTAKE CONTAMINATION OF HIGH-RISE RESIDENTIAL BUILDINGS, 26
- REFINING OF CMHC HOUSING AFFORDABILITY INDICATORS, 77
- REMOTE MONITORING AND CONTROL OF ON-SITE WASTEWATER TREATMENT, RECYCLING AND RE-USE SYSTEMS, 58
- RENOVATING DISTINCTIVE HOMES: ONE-STOREY HOUSES OF THE '60S AND '70S, 55
- RENOVATING THE HOME FOR ASTHMA: AN INTERVENTION STUDY, 43
- RENTAL, ROOMING HOUSE AND NON-RESIDENTIAL CONVERSION COMPONENTS OF THE RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP PHASE I), 88
- REPAIR AND RETROFIT CASE STUDIES OF THE LOFTS CORTICELLI COMPLEX, 33
- REPAIR NEEDS ASSESSMENT OF RENTAL HOUSING IN THE CITY OF MISSISSAUGA, 92
- REQUALIFICATION OF SUBURBS AND REGULATORY FRAMEWORKS: CURRENT SITUATION AND EASING MEASURES, 65
- RE-SALE OF LEAKY CONDOS: DID THE BUYER KNOW?, 66
- RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY, 44

## TITLE INDEX

- RESEARCH ON SOLUTIONS TO PYRITE-RELATED BACKFILL EXPANSION PROBLEMS, 38
- RESIDENTIAL DEVELOPMENT IN COASTAL COMMUNITIES: ADDRESSING CLIMATE CHANGE THROUGH SUSTAINABLE COASTAL PLANNING, 93
- RESIDENTIAL INTEGRATION OF YOUNG MIGRANTS IN QUEBEC, 101
- RESIDENTIAL INTENSIFICATION BEST PRACTICES FROM ACROSS CANADA, 97
- RESIDENTIAL QUADRANTS: A NEW MODEL FOR SUSTAINABLE SUBURBS, 93
- RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP PHASE II), 88
- RETROFITTING A CITY: A GUIDE FOR MUNICIPALITIES TO IMPLEMENT A BUILDING RETROFIT PROGRAM, 19
- REVISION OF HOME CARE: A GUIDE TO REPAIR AND MAINTENANCE, 55
- REVISIONS TO BRICK VENEER STEEL STUD BEST PRACTICE GUIDE, 34
- REVISIONS TO THE OPERATING GUIDES FOR OWNERS, MANAGERS AND CUSTODIAL STAFF, 52
- RISKING MODEL FOR CO-OPERATIVE HOUSING PORTFOLIO, 67
- ROLE OF INDUSTRY STRUCTURE IN INDUSTRY PRODUCTIVITY, 72
- SAFE EFFLUENT WASTEWATER RECOVERY SYSTEM (SEWRS), 58
- SEABIRD FIRST NATIONS FLEX/HEALTHY HOUSING DEMONSTRATION, 8
- SEISMIC PERFORMANCE OF RAINSCREEN STUCCO, 13
- SEISMIC UPGRADES TO LOW RISE HOUSING, 38
- SEMINARS ON SENIORS' HOUSING TO THE RESIDENTIAL CONSTRUCTION AND HEALTH CARE SECTORS, 95
- SETTING PRIORITIES FOR SUSTAINABLE COMMUNITY SOLUTIONS, 97
- SITUATIONS DE CRISE DANS LES COOPÉRATIVES : MIEUX COMPRENDRE POUR MIEUX INTERVENIR, 67
- SPACE EFFICIENT UNIVERSAL DESIGN INNOVATIONS, 86
- SPECIAL STUDIES ON 1996 CENSUS DATA, 75
- STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS, 14
- STRATEGIES TO PRESERVE THE EXISTING RENTAL HOUSING STOCK IN GREATER VANCOUVER, 92
- STUDY OF HIGH-RISE ENVELOPE PERFORMANCE IN THE COASTAL CLIMATE OF BRITISH COLUMBIA, 34
- STUDY OF NECESSARY CHANGES TO HARMONIZE STANDARDS REQUIREMENTS RELATED TO COMBUSTION VENTING, 26
- STUDY OF TENANT EXITS FROM HOUSING FOR CHRONICALLY HOMELESS PEOPLE, 71
- STUDY OF THE MIDWEST BUILDING PRODUCTS MARKET IN THE REGIONS OF ILLINOIS, WISCONSIN AND MISSOURI, 82
- STUDY ON THE RESIDENTIAL INTEGRATION OF IMMIGRANT YOUTH IN MONTRÉAL, 78

## TITLE INDEX

- STUDY ON THE RESIDENTIAL PATH OF PEOPLE AGED 45 TO 64 YEARS IN THE MONTRÉAL AND QUÉBEC CENSUS METROPOLITAN AREAS (CMAS), 84
- SUPPLY OF LABOUR IN THE RESIDENTIAL CONSTRUCTION INDUSTRY, 73
- SURVEY AND LITERATURE REVIEW OF SOCIOECONOMIC TRENDS AFFECTING CONSUMERS AND HOUSING MARKETS, 84
- SURVEY OF MULTI-UNIT RESIDENTIAL BUILDING CHARACTERISTICS AND ENERGY USE DATA, 20
- SUSTAINABLE COMMUNITY PLANNING AND DEVELOPMENT: DESIGN CHARRETTE PLANNING GUIDE: FINAL REPORT, 98
- SUSTAINABLE COMMUNITY SITE PLAN, INFRASTRUCTURE PLAN AND HEALTHY HOUSE DESIGNS, 9
- SUSTAINABLE INTEGRATION OF INFRASTRUCTURE AND BUILDINGS: A FOLLOW-UP WORKSHOP TO THE SUSTAINABLE BUILDINGS 2000 CONFERENCE, 99
- TAXATION OF RESIDENTIAL PROPERTY IN CANADA, 79
- TECHNICAL AUDIT AND RESERVE FUND STUDY, LEBRETON FLATS DISTRICT HEATING SYSTEM, 27
- TECHNICAL AUDIT COURSE FOR PROPERTY MANAGERS, 52
- TECHNOLOGY ROAD MAP FOR INTELLIGENT BUILDING TECHNOLOGIES, 34
- TESTING CONSUMER RECEPTIVITY TO SUSTAINABLE COMMUNITY DESIGN FOR A DEMONSTRATION-BUILD SITE IN OKOTOKS, ALBERTA, 99
- TESTING OF AIR BARRIER MEMBRANES IN WALL ASSEMBLIES, 13
- THEORY TO PRACTICE: LESSONS LEARNED FROM THE USE OF PERFORMANCE ASSESSMENT MEASURES TO IMPLEMENT SUSTAINABLE COMMUNITIES: FINAL REPORT, 99
- TIPS ON SELLING IN THE U.S. GREEN HOUSING MARKET, 82
- TOGETHER INDEPENDENTLY: A HOUSING CONCEPT TO AID THE COMMUNITY INTEGRATION OF SENIORS AND DISABLED ADULTS = ENSEMBLE MAIS AUTONOMES : UN CONCEPT DE LOGEMENT QUI FAVORISE L'INTÉGRATION DES ÂÎNÉS ET DES ADULTES HANDICAPÉS DANS LA COLLECTIVITÉ, 95
- TRANSFORMING YOUR PRACTICE: INTEGRATED DESIGN CHARRETTES FOR SUSTAINABLE BUILDINGS: TORONTO CHARRETTE RESULTS, 56
- UNDERSTANDING THE MOTIVATIONS OF HOMEOWNERS TO CONVERT THEIR BUNGALOWS IN QUÉBEC CITY SUBURBS, 89
- UPDATE OF THE STUDY ON MID-ATLANTIC BUILDING MATERIALS MARKET, 82
- UPDATE THE NORTHERN UTILITY COSTS REPORT, 51
- URBAN ABORIGINAL PERCEPTIONS OF ACCESS TO HOUSING, 64
- USE OF ON-SITE WASTE WATER RECYCLING MICROSYSTEMS FOR SPRINKLER SUPPLY, 51
- USER INTERFACE FOR CD-ROM ON MARKET GUIDES TO THE U.S., 82
- WATER AND SEWAGE HANDLING SYSTEMS IN NORTHERN AND REMOTE COMMUNITIES, 59
- WATER EFFICIENCY CASE STUDIES, 59



## TITLE INDEX

- WATER QUALITY MONITORING OF THE TORONTO HEALTHY HOUSE, 59
- WHY CITIES MATTER: POLICY RESEARCH PERSPECTIVES FOR CANADA, 65
- WOOD USAGE IN STRAW BALE HOUSE CONSTRUCTION, 38
- WORKSHOP ON WOOD CONSTRUCTION DETAILING, 39



Visit our Web site at: [www.cmhc.ca](http://www.cmhc.ca)











